Design Resource

Kitchen Products

The Sanctum Sanctorum of the Indian household

by
Madhuri Menon
IDC, IIT Bombay

Source:
https://dsource.in/resource/kitchen-products

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

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1. Introduction
   1a. Traditional Practices
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Introduction

The role of the Indian home kitchen is very important – it is the soul of an Indian home and it used to be considered the sanctum sanctorum of the Indian household. Food is an integral part of Indian culture as in most cultures and plays an important role in family life and festival celebrations. In fact, most Indian families still sit down together to enjoy their meals.

An Indian kitchen stores spices, herbs, oils, grains, and pulses, use the mortar and pestle, Matkas, Bharanis, Degchis, Pakkads and Tawas, etc. which have kept Indian cuisine alive and also popularised it all over the world. Indian cuisine is an amalgamation of different cooking styles and tastes of its different regions and has been changing over the years.

Along with the ingredients, it is the usage of unique utensils, items, and kitchen helpers, that has brought in the Indian identity. But slowly change has crept in and the Indian home kitchens have undergone a metamorphosis into sleek, chic, modern presentations. Some products, processes, and beliefs, have been replaced, though still carrying along whiffs and remainders of the past. These changes are less visible in rural homes and middle-income urban homes as compared to higher-income urban homes.

A study of some of these interesting, and uniquely designed Indian kitchen products, and beliefs, enrich one's understanding of a facet of Indian culture and also its identity. The following pages take one through such a journey where some old, and some new kitchen products which are a part of our daily lives are briefly explained.

Traditional Practices

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1. Introduction
   1a. Traditional Practices
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Traditional Practices

Some Traditional Practices followed in the Indian Kitchens

The kitchen in a Hindu home is considered as a sacred place and some deeply held beliefs were followed without question. The women of the family who worked in these kitchens were expected to follow all these norms and also pass them on to the next generation.
A Hindu kitchen was called a 'Rasoi Ghar', and a Muslim kitchen was called a 'Bawarchi Khana'.

Location of the kitchen

Vastu Shastra is a traditional Hindu system of design based on directional alignments. Building a house as per the Vastu norms is very much essential because it brings congruent balance amidst assorted atmospheric natural energies including cosmic energy, solar energy, lunar energy, and much more. There is an invisible and constant relation between all the five elements. Thus, the person can improve their conditions by properly designing their buildings by understanding the effectiveness of these five natural forces. Vaastu sastra combines all the five elements of nature { EARTH (Bhumi), WATER (Jala), AIR (Vayu), FIRE (Agni), SPACE (Akasha) }, and balances them with the person and the material. It takes advantage of the benefits bestowed by the five elements of nature to create a congenial living and working environment thereby facilitating spiritual well-being and paving the way for enhanced health, wealth, prosperity and happiness.

Vastu for the Kitchen :

Kitchen is a place, where food is cooked every day. Several factors need to be considered while constructing a home kitchen. Some Vastu principles followed for the positioning of a kitchen are mentioned below.

Essential Vastu tips for a home kitchen:

• The right place to set a kitchen is in the southeast corner of the home. If an apt position cannot be found, then one can avail the alternative of locating it in the northwest corner.

• Building kitchen in northeast, mid-west, mid-north, mid-south, south-west or in the centre is strictly not recommended, as they are out of Vastu norms.

• It is necessary to ensure that the cooking area never touches the sidewall of northern or eastern side of a home.

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1. Introduction
   1a. Traditional Practices
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

• The right location to cook food is by setting it in the direction of east.

It was believed that constructing a house by closely sticking with the Vastu principles would drive away the negative powers and bring peace, success, and health to the dwellers residing in the home. Some of these principles are being followed by some people to this day, whereas some have given up such a practice as they believe that God exists everywhere so he protects and guides everyone and everything equally.

Floor oriented kitchen

India is a floor-oriented society. People in India especially in rural areas squat and sit on the floor for performing most of their routine functions. The sitting posture is different for different functions. Women squat on their haunches or sit on the floor of the kitchen while preparing food, while eating or drinking people sit cross legged on the floor. Also, many of the kitchen items are placed on the floor like the Chulha (cooking stove), Bonti (all-purpose kitchen knife), Manthani (Butter churner) so the cooking process happens at the floor level.

No Shoes (leather articles) were allowed in the kitchen

One had to remove shoes and leave them behind before entering a kitchen, which is still practised in most of South India and in rural India. In the olden days, leather from cows that died naturally was sewn to make Chappals (Sandals), and Jooti (Shoes). It was strictly prohibited to kill cows (as they are considered holy) to harvest leather. Hindus did not allow leather articles like shoes, belts, handbags etc to be brought inside the house. The leather items were left at the entrance of the house. As time passed, wearing shoes inside became acceptable, except for the kitchen, and Pooja room. For that matter Hindus do not wear any shoes or chappals inside temples, they are left out at the entrance. The other main reason is regarding health and hygiene. The shoes/ chappals collect bacteria, dirt and other stuff from the roads, footpaths, playgrounds etc and if they are brought into a home it is believed they may pollute the home and spread diseases.

Rules to follow before entering the Indian kitchen

No one was allowed to enter the kitchen without taking a bath, with the exception of infants being nursed by their mothers. Washing hands was and is required by all the family members before eating meals. One had to sit cross legged on the floor to eat meals. One could not lie down, squat or stand to eat meals. Food was eaten with the hands and flatware like knife (Chhuri), fork (Kanta), and spoon (Chamcha) were not used to eat meals. Only recently flatware has been used for eating, sometimes at home and mostly in public eatery places like fancy restaurants.

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1. Introduction
   1a. Traditional Practices
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Not everyone was allowed to enter a Hindu kitchen

- The women during menstruation, or after giving birth to a baby were not allowed to enter the kitchen as they were considered to be 'unclean'.
- Non-Hindus (Muslims, Christians, Jews, Parsis, etc) were not allowed to enter a Hindu Kitchen. Also within the Hindu religion itself, people belonging to a lower caste were not allowed to enter the kitchen belonging to a higher caste, with the exception of Brahmins. Brahmins were allowed to enter any Hindu Kitchen as they were the highest in the Indian caste order.
- Non-vegetarians of any caste or religion were not allowed to enter a vegetarian Hindu's kitchen.

Taboo against Menstruation, post-childbirth for women

A woman during menstruation was considered 'polluted' and 'not clean'. During this time, a woman was not allowed to enter the kitchen, or Pooja room, or temples. She was not allowed to bathe in public places such as ponds or rivers, and even community wells were off-limit. She was given water and food to survive, but her eating and drinking utensils were kept separate. This probably gave the women much-needed rest from the harsh chores of daily life. After the first four days, the earthenware used by the woman was broken and discarded, she had to take a ritual bath and then only could she enter the kitchen to resume her duties.

After giving birth to a baby, a woman was considered 'un clean'. For the first 40 days, she was not allowed to enter the kitchen, Pooja room, temples, or participate in religious ceremonies or move out of the home. The food was prepared by the other members of the family. This probably was imposed to give the new mothers much need rest from their daily chores and also bond with the newborn baby. After 40 days, the earthenware used by the woman was broken and discarded, and a ritual bath was given for purification before she could enter the kitchen and resume her duties.

Cow dung

Cooking stoves (Chulha, Angithi, Bhatti), the entrance of a house (Aangan), sometimes the mud walls of a hut, and even the wedding altar (Mandap) were coated with cow-dung and then plastered over with local clay, as it was believed that the cow-dung purifies the area by acting like an insecticide. The smoke from burning Upla (dried cow dung cakes) repels insects such as mosquitoes. The use of cow dung has become an integral part of Hindu culture.

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Source:
https://dsource.in/resource/kitchen-products/introduction/traditional-practices

1. Introduction
   1a. Traditional Practices
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Water Storage

In the olden days, there was no running water. The drinking water was collected from rain. The collected water was stored in underground tanks called Kunds. Philanthropists dug up community wells for public usage. Women would go to these wells to bathe and fetch water for use at home. The water was stored in vessels made from local clay, copper, or brass. The clay vessels (Gharas) were considered hygienic as they were purified by the fire while burning in the kiln. The metal Copper was considered to purify water so copperware such as lotas was used to drink water. The temples would store Ganga-Jal (holy water from Ganges River) in copperware. Copperware is still used in temples and Pooja rooms.

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Source:
https://dsource.in/resource/kitchen-products/utensils-cooking

1. Introduction
2. Utensils of Cooking
   2a. Kadia
   2b. Deghchi
   2c. Tawa
   2d. Tope
   2e. Handi
   2f, 2g, 2h, 2i, 2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Utensils of Cooking

Utensils of India - the heart of Indian Cooking. A peep into any kitchen in India will show an array of utensils used to prepare various dishes. Whether to roll a simple Roti or to cook an elaborate cuisine, a wide range of utensils are used. The foods prepared in these traditional kitchens were aromatic, flavourful and delicious. Indian utensils have evolved over the years not forgetting their essential purpose. The cookware that existed in the original Indian kitchen is very different from what is available today. The materials used, the different manufacturing processes for producing these utensils, and the ease of cleaning are the factors which have brought in the changes. Still, there are several traditional Indian utensils that are still being used and in demand up to now but are manufactured using modern methods and modern materials. In India utensils make excellent gifting solutions for Indian marriages - it's one way to help someone set up their home.

Some Basic Techniques of Indian Cooking:

Bhapa: This technique is simply steaming, usually in banana leaves or in foil. This is used in Eastern India and other parts of India for fish and vegetables. Since no oil is used in the cooking process the food cooked in this way is very healthy.

Bhunao/Kasha: This is the process of cooking mainly rich meat dishes in an onion spice base on low heat stirring frequently for a very long time. Though the end product is very tasty, foods cooked like this have a lot of calories.

Bagar/Chowk or Sambara: This is the process of tempering foods with the final addition of spices and ghee/oil. It is used for dishes like dals, and chutneys. It lends a special flavour and a finishing touch to the dish.

Dum-Pukt: This process is cooking in a sealed steam pot; this method is typical of the cooking of Lucknow and is used for rice dishes such as Biryanis and Pulavs. This method of cooking under sealed pressure is called Dum Pukt. Some even place the charcoals on the top of the lid to distribute heat evenly.

Talna: This is the term for frying both deep and shallow. Tikkis and kababs, puris are cooked this way. Since a lot of oil is used in this process the foods cooked in this way are loaded with calories.

Sekhna: This is the process of pan roasting for nuts, rotis or chapatis on a Tawa or griddle.

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1. Introduction
2. Utensils of Cooking
   2a. Kadia
   2b. Deghchi
   2c. Tawa
   2d. Tope
   2e. Handi
   2f, 2g, 2h, 2i, 2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Kadia

Deghchi

Tawa

Tope

Handi

Pressure Cooker

Idli Moulds

Tadkawati

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Frying Pan

Urli

Paarat

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1. Introduction
2. Utensils of Cooking
   2a. Kadia
   2b. Deghchi
   2c. Tawa
   2d. Tope
   2e. Handi
   2f, 2g, 2h, 2i, 2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Design Resource

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Source:
https://dsource.in/resource/kitchen-products/utensils-cooking/kadia

1. Introduction
2. Utensils of Cooking
   2a. Kadia
   2b. Deghchi
   2c. Tawa
   2d. Tope
   2e. Handi
   2f, 2g, 2h, 2i, 2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Kadia

A kadia is an Indian wok.

The kadai is normally used for deep-frying, stir-frying, and making curries. It is a round-bottomed heavy cook-ware with two loop-shaped handles extending from the rim. Larger versions are called 'Kadha'. Nowadays, a smaller version of the same in brass or copper is used to serve rice-based or gravy-based dishes in restaurants serving Indian cuisine.

The traditional Kadai is usually made of thick high-carbon iron, cast iron, brass, or aluminium. Better quality kada-is have a heavy bottom where a layer of aluminium is sandwiched between two layers of stainless steel for better and even heat distribution. Nowadays they are also available in the non -stick (Teflon coated) material, and hard anodised aluminium too. Some of them are available with lids too.

Iron kadai

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1. Introduction
2. Utensils of Cooking
   2a. Kadia
   2b. Deghchi
   2c. Tawa
   2d. Tope
   2e. Handi
   2f, 2g, 2h, 2i, 2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Design Resource

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1. Introduction
2. Utensils of Cooking
   2a. Kadia
   2b. Deghchi
   2c. Tawa
   2d. Tope
   2e. Handi
   2f, 2g, 2h, 2i, 2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Hard anodised aluminium kadai

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https://dsource.in/resource/kitchen-products/utensils-cooking/kadia

1. Introduction
2. Utensils of Cooking
   2a. Kadia
   2b. Deghchi
   2c. Tawa
   2d. Tope
   2e. Handi
   2f, 2g, 2h, 2i, 2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Aluminium kadai

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Source:
https://dsource.in/resource/kitchen-products/utensils-cooking/deghchi

1. Introduction
2. Utensils of Cooking
   2a. Kadia
   2b. Deghchi
   2c. Tawa
   2d. Tope
   2e. Handi
   2f, 2g, 2h, 2i, 2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Deghchi

A Degchi is the most commonly used utensil in Indian kitchens for the purpose of cooking. A large Degchi is called a deg.

This essential Indian utensil is broad-rimmed and has a curved pan at the base. It is used for cooking lentils or daals, rice pudding or kheer, and other delicacies that have a liquidized base.

The Degchi's neck is slightly narrower than its curved, thick base, making it a versatile pan for cooking sauces, gravies and milk-based dishes. The wide rim is used to lift or handle the utensil. A Degchi is covered with a lid during cooking. They are available in many sizes, and big Degchi is used for cooking large amounts of food and making dishes like biryanis.

The Degchi is traditionally made of brass or copper. Nowadays stainless steel is also used to manufacture them. The exterior of one may be clad with copper for better heat distribution and conductivity. Some of them have a heavy bottom where a layer of aluminium is sandwiched between two layers of stainless steel for the same purpose.

Degchi in different sizes

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1. Introduction
2. Utensils of Cooking
   2a. Kadia
   2b. Deghchi
   2c. Tawa
   2d. Tope
   2e. Handi
   2f, 2g, 2h, 2i, 2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

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Source:
https://dsource.in/resource/kitchen-products/utensils-cooking/tawa

1. Introduction
2. Utensils of Cooking
   2a. Kadia
   2b. Deghchi
   2c. Tawa
   2d. Tope
   2e. Handi
   2f, 2g, 2h, 2i, 2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Tawa

A skillet is called as the Tawa (in Hindi) or Penam (in Telugu). A Tawa is usually circular, with a flat or slightly concave cooking surface. Some Tawas have a small wall around the circular surface. Different types of Tawas are used for making different varieties of food items like chapattis, pancakes, parathas, rotis, dosas, utappams, pesarattu (a type of dosa specific to Andhra Pradesh), omelettes etc.

The traditional Tawas were made of iron and were quite heavy. Some of them had a wooden handle to hold them, so it was easy to move this heavy device to and from the stove easily, especially when it was hot.

Tawas are made of thick iron or aluminium. Some are available with handles. Teflon-coated (non-stick) Tawas are extremely popular nowadays as very little oil is required while cooking. They are lighter and are rapidly replacing the traditional Tawas as they are easier to use and maintain. Though there is ease of usage with the non-stick Tawa, the iron Tawa is considered a healthier option while cooking on a daily basis.

Non-stick / teflon coated tawa

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1. Introduction
2. Utensils of Cooking
   2a. Kadia
   2b. Deghchi
   2c. Tawa
   2d. Tope
   2e. Handi
   2f, 2g, 2h, 2i, 2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

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Source:
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1. Introduction
2. Utensils of Cooking
   2a. Kadia
   2b. Deghchi
   2c. Tawa
   2d. Tope
   2e. Handi
   2f, 2g, 2h, 2i, 2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Unni appam pan:

This is a traditional iron Tawa or pan - but with 7 small cup-like depressions and may have handles. The depressions hold the batter, and this pan is used to cook a South Indian breakfast called "Ponganalu" or "Unni appams". These are available in the non-stick variety too and are much lighter than the iron ones.

Non-stick / teflon coated unniappam pan

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1. Introduction
2. Utensils of Cooking
   2a. Kadia
   2b. Deghchi
   2c. Tawa
   2d. Tope
   2e. Handi
   2f, 2g, 2h, 2i, 2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Tope

A Pateela is a utensil with straight-sides and a flat bottom. The top of a pateela flares out to form a rim all around. This rim helps in picking up and moving the utensil around. The utensil comes in varying sizes and is used for boiling water, milk, and preparing watery items like rasam, sambhar, etc. The larger version of the Pateela is called a Bhigona.

Earlier Pateelas were made of Brass. Nowadays Stainless Steel and aluminium are the materials that are widely used. They are available with a perfectly matched lid. These are ergonomically designed utensils which are durable and user-friendly in nature.

Tope with lid in different sizes

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1. Introduction
2. Utensils of Cooking
   2a. Kadia
   2b. Deghchi
   2c. Tawa
   2d. Tope
   2e. Handi
   2f, 2g, 2h, 2i, 2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

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https://dsource.in/resource/kitchen-products/utensils-cooking/handi

1. Introduction
2. Utensils of Cooking
   2a. Kadia
   2b. Deghchi
   2c. Tawa
   2d. Tope
   2e. Handi
   2f, 2g, 2h, 2i, 2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Handi

Handi is a type of utensil that has a spherical bottom with a broad rimmed opening at the top. Handiya is a smaller version of Handi.

Handis can be made of clay, brass and copper. Nowadays, the stainless steel handis are used more than one made of any other material. Some of the stainless steel handis may have the exterior clad with copper especially at the base. This helps in better heat distribution and conductivity.The bottom-half of a handi is spherical and deep, and this tapers linearly into a narrow neck towards the top. The diameter at the top is about 60% of the diameter of the bottom of the handi. The opening at the top has a narrow neck and flares out to form a rim. As there is no handle the utensil is lifted by holding this rim.

Handis are used for boiling liquids such as milk, preparing semi - gravy food items like kheer, sambhar, rasam, daal, etc.

The narrow opening at the top helps in trapping and retaining heat for a longer time.

Larger handis are used for cooking pulavs/biryanis as well as meats in the Dum Phukt fashion. For this, the handi's mouth is covered with a plate and the edges are sealed with a thick and single layer of dough and the Handi is left on charcoal for several hours till the pulav/biryani is to be served. The heat creates steam, which condenses and rolls down the sloped walls. 'Dum' means warm breath signifying the steam. The 'Pukht' means choking. 'Dum Pukht' means choking the steam and preventing it from escaping. This style of cooking is called 'Dum Pukht' in Indian cooking and imparts a wonderful aromatic flavour to the dish.

Handis made of copper are used to serve food nowadays at homes and more specifically in Indian restaurants. In urban India such utensils are also used as a show pieces to increase the aesthetic ambience of the kitchens or homes!

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https://dsource.in/resource/kitchen-products/utensils-cooking/handi

1. Introduction
2. Utensils of Cooking
   2a. Kadia
   2b. Deghchi
   2c. Tawa
   2d. Tope
   2e. Handi
   2f, 2g, 2h, 2i, 2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Stainless steel Handi

Design Resource

Kitchen Products

The Sanctum Sanctorum of the Indian household

by
Madhuri Menon
IDC, IIT Bombay

Source:
https://dsource.in/resource/kitchen-products/utensils-cooking/pressure-cooker

1. Introduction
2. Utensils of Cooking
   2a, 2b, 2c, 2d, 2e
   2f. Pressure Cooker
   2g. Idli Moulds
   2h. Tadkawati
   2i. Frying Pan
   2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

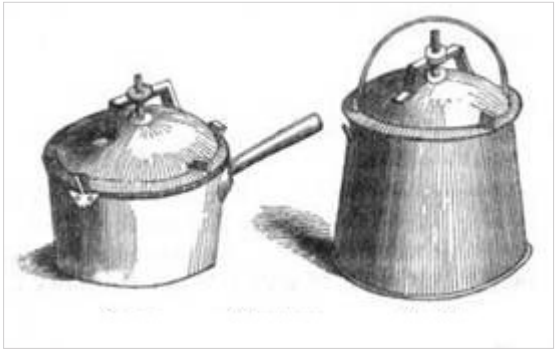
Pressure Cooker

Pressure cooking is a method of cooking that does not permit air or liquids to escape below a preset pressure in a sealed cooker.

The boiling point of water increases as the pressure in a cooker increases, so the steam that is formed builds up pressure inside the cooker which raises the boiling point of water and therefore the cooking temperature. Pressure is created at the beginning with boiling water, inside the closed pressure cooker and the trapped steam increases the internal pressure and temperature, which is maintained throughout cooking time. Normally open-pot cooking is done at the boiling point of water which produces steam at sea level at 100oC (212oF).

In a pressure cooker, the steam permeates through the food, tenderizing it, infusing it with flavour, and preserving nutrients, colour, texture and juices and the cooking process is faster. Most Indian pressure cookers cook food at 121oC (250oF) at a pressure of 15 lb per square inch (psi) which is equivalent to 1 kg per square cm.

An early pressure cooker, called a steam digester, was invented by Denis Papin, a French physicist, in 1679.



The picture shows two digesters;] both, however, on the same principle, and made of cast iron; No. 1 being of the smaller size, and No. 2 for any quantity from half a gallon upwards; the price being, according to the size, from 12 shillings to 30 shillings, and for the smaller sort half the former sum.
Murray's Modern Cookery Book, by a lady, c1851

Pressure cookers are used for different purposes. Some are used by laboratories and hospitals to sterilize materials and are known as an autoclave. Some are used in the food industry, especially as pressure canners, due to their capacity to hold jars used in canning.

Pressure cooking is often used to simulate the effects of long braising or simmering foods in shorter periods of

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1. Introduction
2. Utensils of Cooking
   2a, 2b, 2c, 2d, 2e
   2f. Pressure Cooker
   2g. Idli Moulds
   2h. Tadkawati
   2i. Frying Pan
   2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

time. Since pressure cooking depends on the production of steam, this process cannot be used easily for methods of cooking that produce little steam, such as roasting, pan frying or deep frying.

Image source

Stainless Steel
Stainless steel cookers allow hygienic cooking, as the metal surface is more resistant to pits and scratches than the softer aluminium. Also, this material can handle acidic foods better. Since it's harder than aluminium, the chances of accidental bursting from pressure build-up are reduced too. Stainless steel is easier to clean too.

Higher quality stainless steel pressure cookers are made with heavy copper-clad bottoms (this helps in heat spreading) for uniform heating, as stainless steel has lower thermal conductivity.

Stainless steel pressure cooker

[Image source]

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Source:
https://dsource.in/resource/kitchen-products/utensils-cooking/pressure-cooker

1. Introduction
2. Utensils of Cooking
   2a, 2b, 2c, 2d, 2e
   2f. Pressure Cooker
   2g. Idli Moulds
   2h. Tadkawati
   2i. Frying Pan
   2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Hard Anodised Aluminum:

This material is recommended by experts for making cookers. Hard anodised Aluminium is made when a layer of aluminium oxide is deposited over the aluminium sheet through electrolysis thus making it:

- It is five times harder than normal aluminium, thus reducing the risk of ruptures and accidents while cooking.
- It is as good a heat conductor as aluminium.
- It is easier to clean the cookers made of this material than standard aluminium cookers.

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1. Introduction
2. Utensils of Cooking
   2a, 2b, 2c, 2d, 2e
   2f. Pressure Cooker
   2g. Idli Moulds
   2h. Tadkawati
   2i. Frying Pan
   2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Hard anodised aluminium pressure cooker

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Source:
https://dsource.in/resource/kitchen-products/utensils-cooking/pressure-cooker

1. Introduction
2. Utensils of Cooking
   2a, 2b, 2c, 2d, 2e
   2f. Pressure Cooker
   2g. Idli Moulds
   2h. Tadkawati
   2i. Frying Pan
   2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

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1. Introduction
2. Utensils of Cooking
   2a, 2b, 2c, 2d, 2e
   2f. Pressure Cooker
   2g. Idli Moulds
   2h. Tadkawati
   2i. Frying Pan
   2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Parts of a Pressure Cooker [Image sources]
Aluminium Pressure Cooker

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Source:
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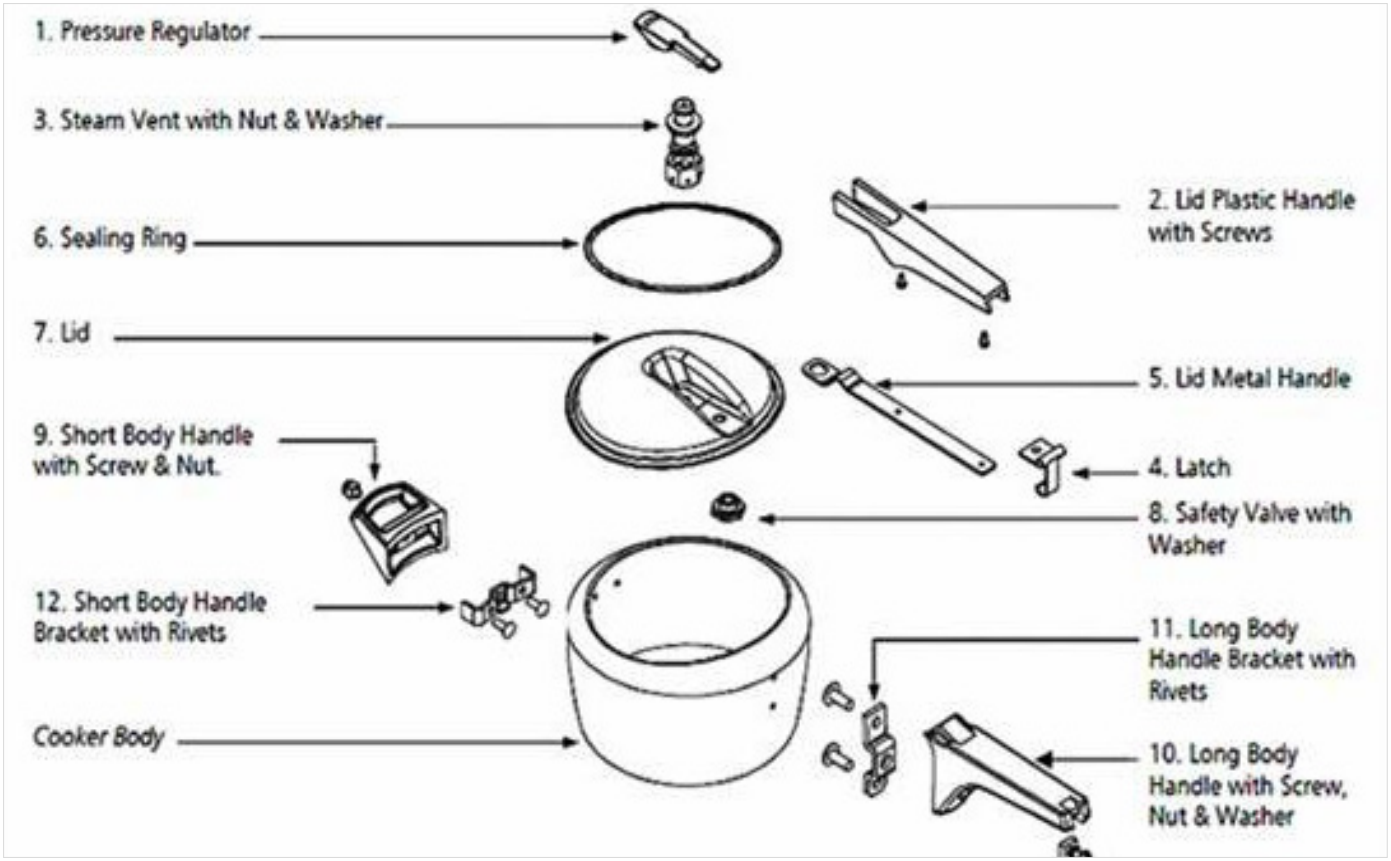
1. Introduction
2. Utensils of Cooking
   2a, 2b, 2c, 2d, 2e
   2f. Pressure Cooker
   2g. Idli Moulds
   2h. Tadkawati
   2i. Frying Pan
   2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Hard Anodized Pressure Cooker


1. Pressure Regulator
3. Steam Vent with Nut & Washer
6. Sealing Ring
7. Lid
9. Short Body Handle with Screw & Nut.
12. Short Body Handle Bracket with Rivets
Cooker Body
2. Lid Plastic Handle with Screws
5. Lid Metal Handle
4. Latch
8. Safety Valve with Washer
11. Long Body Handle Bracket with Rivets
10. Long Body Handle with Screw, Nut & Washer

Using a Pressure Cooker

The cooker is taken out from the storage unit.

Two cups of water are poured into the cooker's body. 1 teaspoon (5 ml) lemon juice or vinegar (not for anodised cookers) is added to this water to prevent discolouring of the cooker. All the food that is required to be cooked is placed in the utensils with the right amount of water or liquids and placed inside the cooker.

The pressure regulator is removed from the steam vent. The steam vent is checked to ensure that it's clear.

The sealing ring or gasket is seated properly. The cooker is closed with the lid and the cooker is placed on the

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Source:
https://dsource.in/resource/kitchen-products/utensils-cooking/pressure-cooker

1. Introduction
2. Utensils of Cooking
   2a, 2b, 2c, 2d, 2e
   2f. Pressure Cooker
   2g. Idli Moulds
   2h. Tadkawati
   2i. Frying Pan
   2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

stove (gas, electric, ceramic or halogen) on high heat.

When water boils, hot air and/or steam should be issued only from the steam vent. If steam comes out around the edge of the lid, centralization of the lid is checked thus: by unlatching and repositioning the lid by moving the lid slightly towards the spot where steam is escaping and re-latching.

[Image sources]

Once steam starts coming out of the steam vent steadily, the pressure regulator is placed on the steam vent and pressed down firmly. A click indicates that the pressure regulator is in position. In about 2 minutes, the cooker should come to full operating pressure.

After the pressure regulator is placed on the steam vent, after about two minutes, steam starts coming out of the pressure regulator slightly, with a very low hissing sound. Then steam emission increases to full force and the pressure regulator lifts with a whistling sound. The pressure inside the cooker at this time is usually about 15 pounds per square inch (1 kg per square cm).

The number of whistles that are let out depends on the duration of cooking desired, and also on the contents to be cooked.

Once the cooking process is complete the heat is turned off and the cooker is removed from the stove and placed aside, and allowed to cool for sometime before opening the lid.

During the process of cooking, the heat need not be kept higher than necessary to maintain the pressure inside.

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Source:
https://dsource.in/resource/kitchen-products/utensils-cooking/pressure-cooker

1. Introduction
2. Utensils of Cooking
   2a, 2b, 2c, 2d, 2e
   2f. Pressure Cooker
   2g. Idli Moulds
   2h. Tadkawati
   2i. Frying Pan
   2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

If the heat is too high, it costs more in terms of fuel consumed and the life of the gasket/sealing ring is reduced by this extra heat. If the heat is set too low e.g. minimum, food may be undercooked or pressure may be lost.

Most modern cookers are dishwasher safe, but in India cookers are washed by hand.

Design And Safety Features

Cooker body
Pressure cookers are generally made from aluminium or stainless steel. Aluminium may be stamped and buffed or anodized. Higher quality stainless steel pressure cookers are made with heavy copper-clad bottom (this helps in spreading of heat) for uniform heating, as stainless steel has lower thermal conductivity. Pressure cookers are usually heavy.

It helps in regulating pressure better, hence food cooks faster, thus saves fuel, and is also easier to insert and remove from the cooker lid.

Longer Lasting Sealing Ring/Gasket -
The gasket is not exposed to food acids in the pressure cooker as it is seated in the rim of the lid, hence it long-lasting.

Rust Proof Components
The pressure cookers normally use special metal alloy handles, covered with heat withstanding plastic parts, and handle brackets to withstand rust.

The Role of pressure
Water boils at 100°C under normal atmospheric conditions so water cannot get any hotter than that. However, if water is put under pressure by sealing the lid of the cooker so that no steam can escape into the air, the pressure on the water is increased and the water boils at a higher temperature.

Most pressure cookers have a working pressure setting of 15 psi over the existing atmospheric pressure. At this pressure boost, relative to sea-level atmospheric pressure, water boils at 122 °C (252 °F). Some pressure cookers have a lower maximum pressure than the industry standard 15 psi, or can be adjusted to different maximum pressures; cooking times will increase accordingly at lower pressures. This is often done by having different regulator weights or different pressure settings.

The higher temperature causes food to cook faster; pressure cooking can reduce normal cooking times by as much as half. Foods such as legumes (lentils, dried peas and beans) and tough cuts of meat can be cooked to

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https://dsource.in/resource/kitchen-products/utensils-cooking/pressure-cooker

1. Introduction
2. Utensils of Cooking
   2a, 2b, 2c, 2d, 2e
   2f. Pressure Cooker
   2g. Idli Moulds
   2h. Tadkawati
   2i. Frying Pan
   2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

perfection in a fraction of the normal time. For example, when pressure cooking at 15 psi, cooking times are typically as follows: Shredded cabbage is cooked in one minute, fresh green beans in three minutes, small to medium-sized potatoes cook in about six minutes, and a whole chicken takes only twenty minutes. Rice and daals can be cooked in ten minutes, instead of 45 minutes of simmering in ordinary utensils. Another advantage is that different items like daals, vegetables, rice etc can be cooked together at one time quickly and in a single cooker instead of using multiple utensils.

Because food cooks faster in a pressure cooker, fuel and therefore money is saved. Scientific research indicates that certain nutritive elements such as proteins and vitamins are better retained by pressure cooking. Also steaming is ideal for low-calorie, low-fat cooking. The higher temperatures that are maintained during pressure cooking produce more hygienic food.

Safety features

A gasket or sealing ring plays an important role in the cooker's function. This forms a gas-tight seal that does not allow air or steam to escape between the pot and the lid; normally, the only way the steam can escape is through a regulator on the lid when the pressure has built up. In case the regulator is blocked, a safety valve is provided as a backup escape route for steam. The simplest safety valve is a loose-fitting rubber plug in the lid, held in place by steam pressure. If the pressure exceeds design limits, the plug pops out of its seat, thereby ensuring there are no explosions.

To seal the gasket, some pressure cookers have a lid lock with handles that works by placing the lid on the pot and twisting it about 30° to lock it in place.

Pressure cookers have a reputation as a dangerous method of cooking with the risk of explosion. Early pressure cookers were equipped with only a primary safety valve and were at a risk of explosion if poorly maintained like allowing food residues to block the release valve.

Modern pressure cookers typically have two or three independent safety valves, as well as some additional safety features, such as an interlock to prevent opening the lid while internal pressure exceeds atmospheric pressure. Another common safety feature is in the design of the gasket, which expands and releases excess pressure downward between the lid and the cooker body.

However, there is still a risk of explosion, especially if cookers are not thoroughly and regularly maintained in accordance with the manufacturer's instructions.

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https://dsource.in/resource/kitchen-products/utensils-cooking/pressure-cooker

1. Introduction
2. Utensils of Cooking
   2a, 2b, 2c, 2d, 2e
   2f. Pressure Cooker
   2g. Idli Moulds
   2h. Tadkawati
   2i. Frying Pan
   2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Design Variations in Cooker

With Indian kitchens gradually making a shift towards the open and smaller ones, the need for accessorizing the kitchen with great looking and compact products has become absolutely essential. Brands like Prestige and Hawkins are constantly innovating their products, to introduce cookers with new features to bring in new trends and also to appeal to the tastes of the consumers.

Apart from these two market leaders, Marlex, Nutan, Vinod, Butterfly, Pigeon, National etc are some of the other popular cooker brands that are available in the markets in the present day.

Presented below are some of the newer versions of cookers available in the markets.

Apple Cooker

This innovation in the pressure cooker segment is from the Prestige brand. With the introduction of pressure cookers in the shape of an apple, they have broken away from the normal mundane shapes.

Apple pressure cookers are attractive and a must have accessory for modern kitchens giving the kitchen a style statement is what the manufacturers feel. It is made of virgin aluminium and has sleek contours and top-of-the-line features meant for consumers having a taste for style. Apple Pressure cookers are available in four different variables; Green and Red Apple cookers, the hard anodized and polished aluminium cookers. Apart from the aesthetics, the pressure cooker is also designed and enhanced with unique features like self-locating pivot for convenient closing, screw type body handle, stainless steel beam for easier handling, new design weight valve/ regulator etc.

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1. Introduction
2. Utensils of Cooking
   2a, 2b, 2c, 2d, 2e
   2f. Pressure Cooker
   2g. Idli Moulds
   2h. Tadkawati
   2i. Frying Pan
   2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Microchef

This cooker is from the Prestige brand. It combines microwave and pressure cooking thus being suitable for preparing local as well as international cuisines. The speedy cooking in microwave oven ensures saving time and energy. This innovative kitchen appliance not only maximises the use of microwave oven, but also preserves the nutrients that are otherwise lost while using an open vessel in the microwave oven. Healthy cooking is the unique selling proposition in this cooker.

Pressure Handi

The pressure handi is aesthetically designed taking inspiration from the traditional Indian handi to give the feel of traditional cooking in a modern kitchen appliance. It is made of polished Aluminium for a sleek look and durability. It can be easily opened and closed by ergonomically designed handles. It has a unique Pressure Indicator on the lid along with multiple safety features.

Inner Lid Cookers

These cookers are from the Prestige brand. They are available as cookers and handis too, which are unique in many ways. This range of pressure cookers are designed to withstand the rigour of Indian cooking for a long time, making them ideal for cooking and serving. The Nakshatra pressure cooker and handi come in vibrant finishes to compliment today's modern kitchens and offer the highest level of safety in inner lid pressure cookers. [Image sources]

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Source:
https://dsource.in/resource/kitchen-products/utensils-cooking/idli-moulds

1. Introduction
2. Utensils of Cooking
   2a, 2b, 2c, 2d, 2e
   2f. Pressure Cooker
   2g. Idli Moulds
   2h. Tadkawati
   2i. Frying Pan
   2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Idli Moulds

Idli is a popular South Indian breakfast item throughout India. The Idlis are usually two to three inches in diameter and are made by steaming a batter consisting of fermented urad dal (de-husked black gram or black lentils) and rice. Idli (and the process of steaming) was unknown in India by as early as 700 AD. This technique was imported from Indonesia, subsequently between 800-1200 CE. The earliest mention of idli occurs in the Kannada writing of Shivakotiacharya in 920 AD.

The stand in which the Idlis batter is poured to produce the Idlis is made out of stainless steel or aluminium. It has 3 to 4 plates with cavities with perforated holes. These plates stand over each other. The base plate has a small support below it, which elevates the plate with the cavities from any surface on which it is kept, and a central vertical rod in the middle, above.

The remaining plates are positioned one over the other along this vertical rod. A plastic knurled knob with a screw embedded inside is used to lock the plates in place at the top of the central vertical rod. This stand is sold as a pressure cooker accessory as it has to be used with one in order to make Idlis.

Cooking of Idli
Ingredients:
Two parts of uncooked rice
One part of urad dal (black gram or black lentil)
2 tablespoons of fenugreek seeds
Salt for taste

Procedure to make the batter:
To make Idlis, two parts of uncooked rice are soaked along with one part of urad dal (black gram or black lentil) in a pan along with 2 tablespoons of fenugreek seeds for 3 hours with sufficient amount of water. The lentils and rice are then ground to a paste in a heavy stone grinding vessel or mixer or wet grinder. The paste is left overnight to ferment until it has expanded to about 2½ times its original volume. A sufficient amount of salt is added for taste and some water too is added to obtain the required consistency of the batter.

Procedure to make the Idlis:
Unscrew knob of idli stand. Remove idli plates from the stand. Rub one drop of oil all over inside of each cavity. Stir batter and fill to the brim each cavity of the bottom plate. Put an empty plate on stand and position it such that one cavity of the upper plate is half way between two cavities of the lower plate. Fill each cavity to the brim. In the same way, fill the remaining 2 plates. Screw on the knob and tighten it gently.

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Source:
https://dsource.in/resource/kitchen-products/utensils-cooking/idli-moulds

1. Introduction
2. Utensils of Cooking
   2a, 2b, 2c, 2d, 2e
   2f. Pressure Cooker
   2g. Idli Moulds
   2h. Tadkawati
   2i. Frying Pan
   2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Pour water (1½ cups /360ml) into a pressure cooker. Place Idli stand in the pressure cooker for steaming. The stand holds the plates above the level of boiling water in a pressure cooker. The perforated cavities allow the Idlis to be cooked evenly. Close the pressure cooker without vent weight. Cook on high heat till steam passes through the vent tube. Reduce heat to medium and cook for 6 minutes, ensuring a steady stream of steam from the vent tube. Remove the pressure cooker from heat. Open the lid. Allow to cool for 2 minutes. Remove the idli Stand. Allow to cool for 2 minutes. Unscrew the knob and remove the plates.

Run a table knife/ large spoon around the edge of each fluffy idli to remove it from the cavities in the plate. Thus all the Idlis can be removed in this way and stored or served hot.

Different types of Idli stands :
Idli stands are usually designed to fit into standard sizes of the pressure cookers available in the market. They can have 4 tiers, 5 tiers or even 6 tiers. Each plate of the tier can have 3 to 4 cavities to hold the batter.

The plate holding mechanism varies with different brands. The materials used for stands are aluminium, stainless steel, food grade plastic. With Indian kitchens embracing cooking using a microwave oven the plastic idli stands help in cooking the Idlis in them much faster than in the traditional way!

Some idli stand to have more cavities, around 12 to 15 in a plate instead of 3 or 4 thus producing mini-sized Idlis which are as popular as the regular-sized Idlis.

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1. Introduction
2. Utensils of Cooking
   2a, 2b, 2c, 2d, 2e
   2f. Pressure Cooker
   2g. Idli Moulds
   2h. Tadkawati
   2i. Frying Pan
   2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Idli stand with removalbe Idli plates

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1. Introduction
2. Utensils of Cooking
   2a, 2b, 2c, 2d, 2e
   2f. Pressure Cooker
   2g. Idli Moulds
   2h. Tadkawati
   2i. Frying Pan
   2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Mini Idli plate

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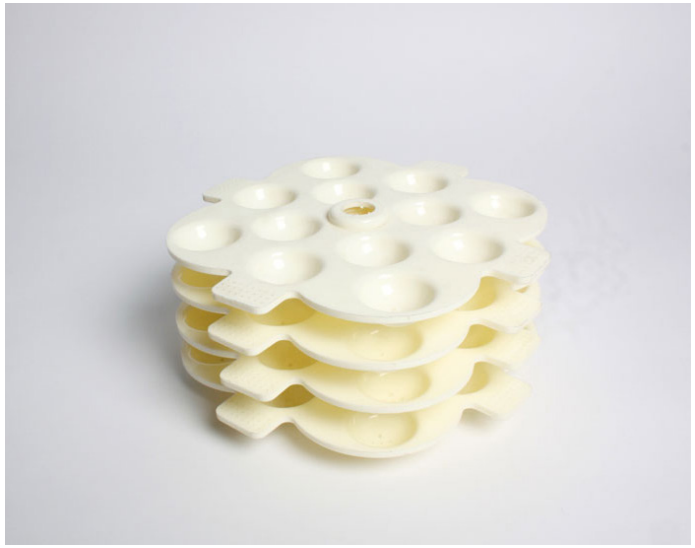
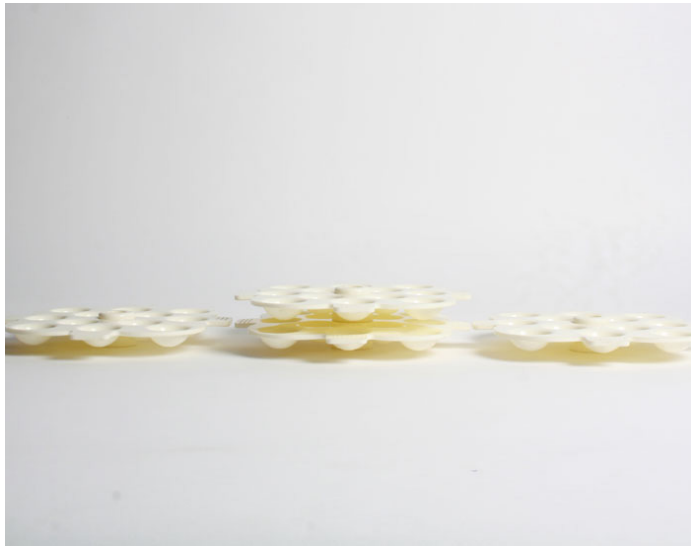
Source:
https://dsource.in/resource/kitchen-products/utensils-cooking/idli-moulds

1. Introduction
2. Utensils of Cooking
   2a, 2b, 2c, 2d, 2e
   2f. Pressure Cooker
   2g. Idli Moulds
   2h. Tadkawati
   2i. Frying Pan
   2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Plastic Idli stand to be used in a microwave oven





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IDC, IIT Bombay

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1. Introduction
2. Utensils of Cooking
   2a, 2b, 2c, 2d, 2e
   2f. Pressure Cooker
   2g. Idli Moulds
   2h. Tadkawati
   2i. Frying Pan
   2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Multipurpose Electrical Idli steamer

[Image source]

This Electric Idli Steamer is sleek in style and light in weight too.

It can produce a maximum of 20 Idlis at one go i.e. it has 5 plates with 4 cavities each.
The Idlis are fat free, as the idli plates do not require greasing of oil or ghee.

It has two transparent chambers in different sizes, to let one see during the process of cooking.
There are tiny vents designed on the periphery, which allow the excess steam to escape.
It is fitted with auto shut-off timer with a 'ding' sound to let one know, when the cooking is done.

This multi-purpose steamer can conveniently steam vegetables too, thus retaining the micro nutrients. It can also steam or slow cook rice to retain its flavour and aroma. It can also steam Rice Noodles, Dhokla, Kolukattai and Puttu (these are different types of steamed snacks made in different parts of India).

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1. Introduction
2. Utensils of Cooking
   2a, 2b, 2c, 2d, 2e
   2f. Pressure Cooker
   2g. Idli Moulds
   2h. Tadkawati
   2i. Frying Pan
   2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Tadkawati

The Tadkawati is very useful in the Indian style of cooking.
It is specifically designed for seasoning dals, chutneys, etc. with specific ingredients. The seasoning lends a very aromatic and tasty flavour. This is done after the dish has been prepared or cooked.

The Tadkawati is a small utensil, usually made of iron, aluminium or hard anodised aluminium. It basically has a small cup shaped vessel attached to a handle. It is small in size as the specific ingredients that are put in are small in quantity, and when they fry together in oil in such a small area all the flavours get infused well.

The handle is an essential element in the Tadkawati, as it helps to transfer the hot Tadka immediately or 'throw in' the hot Tadka into the main dish, the minute all the ingredients are fried or roasted to perfection with ease and without burning hands. Also the handle is long for the same purpose and it also helps in hanging it from the kitchen rack while not in use.

Hard anodised aluminium Tadkawati with steel and bakelite or plastic handle.

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1. Introduction
2. Utensils of Cooking
   2a, 2b, 2c, 2d, 2e
   2f. Pressure Cooker
   2g. Idli Moulds
   2h. Tadkawati
   2i. Frying Pan
   2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

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1. Introduction
2. Utensils of Cooking
   2a, 2b, 2c, 2d, 2e
   2f. Pressure Cooker
   2g. Idli Moulds
   2h. Tadkawati
   2i. Frying Pan
   2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

About Tadka

Seasoning is known as in Popu in Telugu, *Vagrene* in kannada and *Tadka* in the North Indian states. It rescues the dals and the curries from 'blandness'. The technique is simple, but it saves and uplifts them to spicy state. Almost all types of curries, chutneys, lentil preparations like dals, sambhars and Rasams are enhanced by the addition of *seasoning* at the start or just before serving.

The most common ingredients of *Tadka* are
1. Dried red chilli pieces
2. Asafetida
3. Curry leaves
4. Chana dal
5. Urad dal
6. Mixture of Mustard seeds and Cumin.

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1. Introduction
2. Utensils of Cooking
   2a, 2b, 2c, 2d, 2e
   2f. Pressure Cooker
   2g. Idli Moulds
   2h. Tadkawati
   2i. Frying Pan
   2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Frying Pan

The frying pan was introduced by the British in India, and adopted by the Parsi population initially. Now it is one of the integral utensils to be used in Indian kitchens.

It differs from traditional Indian cookware in two aspects. The bottom of the frying pan is usually not curved, but flat instead and the frying pan has a handle to hold unlike the traditional Indian utensils.

The frying pans are available in varying diameters and have a flat bottom surface with straight or slightly curved sides sloped outward. The depth too varies. At the top, there is a handle projecting outward. These were primarily used to cook omelettes but are now used to sauté small quantities of vegetables/meats too. Traditionally they were made of aluminium, but nowadays the non-stick variety is very popular and easy to clean and maintain.

Hard anodised aluminium frying pan

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1. Introduction
2. Utensils of Cooking
   2a, 2b, 2c, 2d, 2e
   2f. Pressure Cooker
   2g. Idli Moulds
   2h. Tadkawati
   2i. Frying Pan
   2j, 2k
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

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1. Introduction
2. Utensils of Cooking
   2a, 2b, 2c, 2d, 2e, 2f
   2g. Idli Moulds
   2h. Tadkawati
   2i. Frying Pan
   2j. Urli
   2k. Paarat
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Urli

This is a large cast brass cooking pot from Southern India known locally as an Urli. Pots were placed directly on a fire and large meals were prepared for special events. Wooden poles were inserted into the metal loops on the sides of the Urlis to carry the heavy pots. Nowadays because of its beautiful form it's used as a decorative element in households – it occupies a place of interest in the living room or at the entrance to a home and is filled with fragrant, colourful fresh flowers or is filled with water in which floating candles or flowers are dispersed aesthetically.

Brass urli

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1. Introduction
2. Utensils of Cooking
   2a, 2b, 2c, 2d, 2e, 2f
   2g. Idli Moulds
   2h. Tadkawati
   2i. Frying Pan
   2j. Urli
   2k. Paarat
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Paarat

A Paarat is a big round plate with high side walls and is generally used for kneading dough. These plates are usually made of Stainless Steel, Brass or Aluminium.

Stainless steel paarat

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
   3a. Kulhar
   3b. Lota (Parsi and Lassi type)
   3c. Tumbler (Steel glass)
   3d. Horn Drinking Glass
   3e. Plastic-Paper glasses
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Utensils for Drinking

An Indian meal is always accompanied with a beverage usually water, sometimes along with water, buttermilk or lassi. These are usually served in drinking glasses. Since ancient times different types of materials have been used for manufacturing glasses clay and copper for the masses, gold and silver for the rich. With industrialisation newer materials like Stainless Steel, different types of plastics, paper are being used widely to manufacture a large variety of drinking glasses.

Khullar

Lota (Parsi & Lassi type)

Tumbler, Steel glass

Horn Drinking Glass

Plastic-Paper glasses

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
   3a. Kulhar
   3b. Lota (Parsi and Lassi type)
   3c. Tumbler (Steel glass)
   3d. Horn Drinking Glass
   3e. Plastic-Paper glasses
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Kulhar

This is a disposable earthen cup/tumbler. Kulhars are beautiful, in the most simple way. A kulhar holds about 7 ounces of fluid. It is used to drink hot beverages such as Chai (tea) or cold beverages such as Thandai.

Kulhars are normally not used at home. They are primarily used by street vendors or at social gatherings. Kulhars are made of local red clay and are half-baked, biodegradable cups. They are usually hand made by a local potter on a potter's wheel.

A lot of people feel that nothing quite compares to drinking chai from one of these clay cups. Its primitive shape cradled in one's hand and its warm dry rim on the lips accompanied by an earthy smell and taste, it imparts to hot chai strikes a deep cord inside. The earthy smell from these pots is absolutely mesmerising.

At one time, these were made mandatory in Indian Railways and were replaced by plastic cups. When Laloo Prasad Yadav became the Railway Minister a few years back he banned the use of the plastic cups and the first thing he announced was that Kulhars or clay pots would be used for all liquid refreshments on trains.

Different sizes and styles of clay kulhars

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
   3a. Kulhar
   3b. Lota (Parsi and Lassi type)
   3c. Tumbler (Steel glass)
   3d. Horn Drinking Glass
   3e. Plastic-Paper glasses
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
   3a. Kulhar
   3b. Lota (Parsi and Lassi type)
   3c. Tumbler (Steel glass)
   3d. Horn Drinking Glass
   3e. Plastic-Paper glasses
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Lota (Parsi and Lassi type)

A Lota is a small, usually spherical utensil made of brass or copper used to carry small quantities of water.

The Lota has a spherical bottom that curves into a neck, and the top of the neck flares out to form a rim. Its shape is such that it fits into the palm of the hand very well and makes carrying and pouring liquids very easy. The size of the opening and inner contours of a Lota are extremely well defined, which helps the easy cleaning of the inside and outside.

A Lota is used to drink water, or to carry water to wash hands. Some Lotas may also be equipped with a spout. Lotas made of copper are used to store the holy water (water from the river Ganges) during worship. It is used in religious ceremonies too, when it is smeared with sandal paste, kum kum (vermillion powder) and yellow turmeric powder.

A Lota is usually made of brass, copper, aluminium, or silver. Nowadays, it is available in stainless steel too in various finishes and sometimes the exterior may be clad with copper.

Stainless steel Lota

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
   3a. Kulhar
   3b. Lota (Parsi and Lassi type)
   3c. Tumbler (Steel glass)
   3d. Horn Drinking Glass
   3e. Plastic-Paper glasses
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
   3a. Kulhar
   3b. Lota (Parsi and Lassi type)
   3c. Tumbler (Steel glass)
   3d. Horn Drinking Glass
   3e. Plastic-Paper glasses
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Tumbler (Steel glass)

Tumblers are also called as 'Gilas' (a Hindi version of 'glass').
Various sized tumblers/ glasses are used for drinking water, milk, juices, beverages etc. The tall tumbler (also known as 'Bada Gilas') is used mostly for drinking Matha (butter milk), Lassi, fruit juices etc.

The drinking glasses used on a daily basis were normally made of copper in the olden days. The rich class used tumblers made of silver or gold. But nowadays, stainless steel and glass tumblers are most popular for domestic use.

Stainless Steel Glasses
A wide range of stainless steel tumblers are used across households and restaurants. These sleek designed tumblers/glasses have a classic appeal and are known for their fine polish, durability, low cost and low maintenance. Stainless steel tumblers are available in a number of different sizes, shapes and outer finishes like brushed steel, frosted steel, etc. to suit different tastes and some manufacturers custom-make them as per the requirements of the clients.

Different styles of Stainless Steel Glasses

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
   3a. Kulhar
   3b. Lota (Parsi and Lassi type)
   3c. Tumbler (Steel glass)
   3d. Horn Drinking Glass
   3e. Plastic-Paper glasses
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
   3a. Kulhar
   3b. Lota (Parsi and Lassi type)
   3c. Tumbler (Steel glass)
   3d. Horn Drinking Glass
   3e. Plastic-Paper glasses
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Copper Glasses:
Sometimes glasses made of this material are preferred over other materials.
Copper glasses/ tumblers, have anti-microbial properties and can inhibit growth of harmful bacteria like E. Coli or Staphylococcus aureus unlike glass or stainless steel tumblers. Storing water for three hours in a copper tumbler can kill harmful bacteria. It is believed that this water can prevent amoebiasis, dysentery, diarrhea, cholera, jaundice and other diseases caused due to water poisoning.

Ayurveda recommends the use of copper tumbler water, to balance all the three Doshas (Kapha, Vata and Pitta) in the human body and helps in getting rid of skin diseases, inflammation, respiratory disorders, piles, spleen and gynecological disorders.

Since oxidation and discolouration of these tumblers take place sometimes, care can be taken by the usage of copper cleaning agents/powders available in the market to retain a shiny finish. Copper tumblers are not dish-washer friendly, as acids contained in the soap tarnish the copperware permanently.

Modern-day Materials
Some manufacturers are now producing beautiful glasses in the glass material, decked with white metal carvings at the base. The drinking glasses have white metal wrapped around the base or the whole body and have a designer look. They have an antique and vintage effect and the white metal used imparts a look of richness. They are engraved with artistic designs, contemporary and oriental motifs. They complement any table, adding magic to the decor of the room.

These drinking glasses are available in different designs and colours. They are available as coloured drinking glasses, vintage drinking glasses, antique drinking glasses, designer glasses, decorative glasses, cocktail glasses, metal glasses, glass cups, transparent drinking glasses etc. Their heights vary from 2.5" to 5" inches based on the design style.

These sculpted by dexterous craftsmen are a sure to mesmerize anyone.
Firozabad glass industry for the last two centuries has been involved in manufacturing drinking glasses, beer glasses, wine glasses in attractive cuttings, and charming designs.

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
   3a. Kulhar
   3b. Lota (Parsi and Lassi type)
   3c. Tumbler (Steel glass)
   3d. Horn Drinking Glass
   3e. Plastic-Paper glasses
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Tumblers made of glass material

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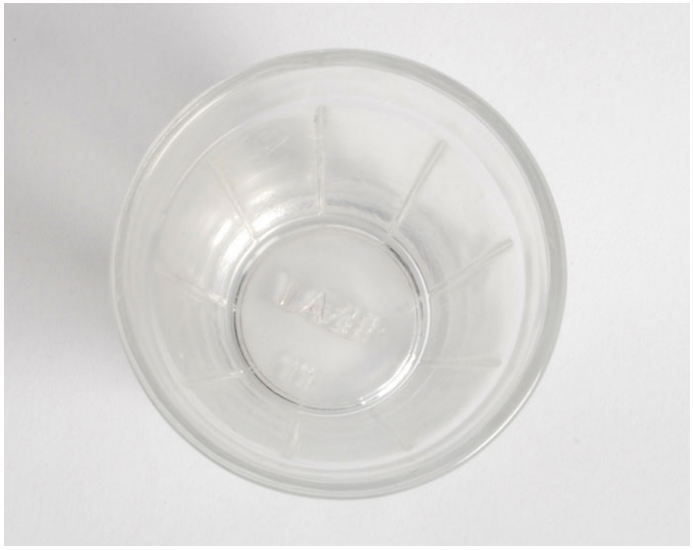
1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
   3a. Kulhar
   3b. Lota (Parsi and Lassi type)
   3c. Tumbler (Steel glass)
   3d. Horn Drinking Glass
   3e. Plastic-Paper glasses
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details



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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
   3a. Kulhar
   3b. Lota (Parsi and Lassi type)
   3c. Tumbler (Steel glass)
   3d. Horn Drinking Glass
   3e. Plastic-Paper glasses
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Horn Drinking Glass

These drinking glasses are made from cow's horns. These horn drinking glasses are crafted by manufacturers with perfection and add elegance to the dining table. These glasses are greatly admired by some users for their smooth finish and superior quality.

[Image source]

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
   3a. Kulhar
   3b. Lota (Parsi and Lassi type)
   3c. Tumbler (Steel glass)
   3d. Horn Drinking Glass
   3e. Plastic-Paper glasses
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Plastic-Paper glasses

A wide variety of disposable glasses are available in plastic materials like Polypropylene (PP), Polystyrene, Styrofoam, etc and also in paper in the present day markets. These are usually used for drinking water, lassi, cold drinks, juices and other hot and cold beverages for marriages, parties (especially children's birthday parties) and functions.

Smaller sizes of these are being used to sell tea/ coffee by small time vendors too, especially outside offices, public spaces, at vending machines etc.

These are available in various shapes, textures and capacities. They are available in double and single colours with an option of multicolour printing on the outer surface.

These glasses are disposable in nature and are very popular in urban areas. Since they have only a one time use and have to be thrown after usage, there is zero maintenance.

But a grave disadvantage is that- some of these glasses when not disposed of properly cause a lot of environmental damage, as plastics are not biodegradable

Disposable glasses in Styrofoam

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
   3a. Kulhar
   3b. Lota (Parsi and Lassi type)
   3c. Tumbler (Steel glass)
   3d. Horn Drinking Glass
   3e. Plastic-Paper glasses
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
   3a. Kulhar
   3b. Lota (Parsi and Lassi type)
   3c. Tumbler (Steel glass)
   3d. Horn Drinking Glass
   3e. Plastic-Paper glasses
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
   3a. Kulhar
   3b. Lota (Parsi and Lassi type)
   3c. Tumbler (Steel glass)
   3d. Horn Drinking Glass
   3e. Plastic-Paper glasses
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Colourful, printed disposable glasses in paper

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
   4a. Eating From a Thali
   4b. Varieties of Thalis
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Utensils Used for Eating

In the olden days 'Pattal' (platters for food) was made as a doily of leaves. 'Dona' (bowls were made with of leaves as well. These were disposable items used to serve food.

Apart from these the Thali is very integral to Indian food. An entire Indian meal is served at once in bowls arranged on the periphery of a Thali. Most of the traditional tableware was made of brass, copper, or Kansa. The food surface was coated with tin (Kalai). Silver with gold trim in tableware was used for the rich class. Nowadays, most of the tableware is made of stainless steel.

Indian food is very diverse. There are many different food items available in Indian meals. Thali is one such meal. Many dishes are presented in one serving. Thali is generally a full plate of meal in which there is a variety of vegetables, lentils (daals), chutney, non-vegetarian dishes, papads, pickles, curd and also sweets served with rice or chapatis. Eating from a 'Thali' is quite common in most parts of India. Thalis are one of the most delicious and inexpensive dishes that one will encounter throughout India.

A Thali is a round metal plate in which a number of bowls are arranged along the boundary of the plate. In South India, the Thali is on a banana leaf. There are different types of vegetable curries in the small bowls. In the centre of the Thali are the rice and chapatis. Every region of India has different types of Thalis. The North Indian Thali has got vegetables like beans or cottage cheese vegetable along with puris (wheat bread rolled into small circular shapes and deep fried in hot oil), or chapatis (rotis- wheat bread rolled into large circular shapes and shallow fried over a hot Tawa), in Rajasthan the Thali has gate ki sabzi and papad ki sabzi. The non-vegetarian Thali has one non-vegetarian dish that contains spice of that region. The flavor of each Thali is unique to its region. Thalis sometimes go even by the regional characteristics of the items they have. For example, one may encounter Rajasthani Thali or Gujarati Thali, the Kerala way of Thali is known as Sadya.

North Indian Thali

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South Indian Thali

Gujarati Thali

Source:
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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
   4a. Eating From a Thali
   4b. Varieties of Thalis
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Eating From a Thali

Varieties of Thalis

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
   4a. Eating From a Thali
   4b. Varieties of Thalis
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Eating From a Thali

Method of Eating from a Thali
During British Raj, the flatware was introduced Spoon (Chamcha), Fork (Kanta), and Butter knife (Chhuri) for eating food, which was alien to Indian eating habits. The general masses just never took to using flatware except for the spoon and fork in public places like restaurants, but still use their hands for eating food.

Indians wash their hands immediately before and after eating a meal as it is believed that food tastes better when eaten with one's hands. Thali is traditionally eaten with one's fingers, and only with the fingers of the right hand, specifically. The left hand is used only for pouring the curries onto rice or serving any other item and to grasp one's drinking glass.

Since rice or chapattis are placed centrally in the Thali, they are combined with the various curries or dals as per the type of Thali and savoured. There is an order to the progression of Thali eating specially in the South Indian vegetarian Thali:

• Begin by eating any of the vegetables (in both curries and dry form) on the plate. You can also eat the vegetables throughout as an accompaniment to the rice and sauce courses to follow.

• The fiery lentil-based vegetable sauce called "sambhar" is next to be eaten (it is added to a portion of rice as you desire).

• The "rasam", mixed with rice, is eaten next.

• Curd (yoghurt) mixed with rice is always eaten last, to cool your palate and aid with digestion. The roasted dry chilli, or pickle can be added for balance.

• A few papads are accompaniment to the rice and gravy/ sauce combinations.

There is sometimes a sweet dessert at the end followed by paan.

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
   4a. Eating From a Thali
   4b. Varieties of Thalis
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Varieties of Thalis

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
   4a. Eating From a Thali
   4b. Varieties of Thalis
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Stainless steel thalis/plates used for snacks

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
   4a. Eating From a Thali
   4b. Varieties of Thalis
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Thali with stainless steel bowls (Vatis)

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
   4a. Eating From a Thali
   4b. Varieties of Thalis
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Bowls/ vatis in different shapes, designs and capacities.

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
   4a. Eating From a Thali
   4b. Varieties of Thalis
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
   4a. Eating From a Thali
   4b. Varieties of Thalis
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

The design of the Thali, with multiple compartments/partitions instead of using many small bowls is a cost effective innovation which serves the same purpose of the Thali minus the extensive washing and storing of the bowls/Vatis, and hence this is a preferred option to serve food in some restaurants.

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
   4a. Eating From a Thali
   4b. Varieties of Thalis
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Stainless Steel Thali with multiple partitions

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
   4a. Eating From a Thali
   4b. Varieties of Thalis
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Disposable Thalis

Disposable tableware has gained a lot of popularity in urban India.
People sometimes use plastic, paper, or styrofoam plates/ Thalis because they are easy to use, light in weight and can be easily disposed of. Some of the paper plates are printed colourfully, especially for use at children's birthday parties. These are preferred to be used when food has to be served at large gatherings, birthday parties for small children, serving of prasad at Indian religious ceremonies etc. The sizes of these plates vary from manufacturer to manufacturer.

Since the plates are disposed of after use, there is no cleaning or maintenance involved and hence a large amount of domestic work is reduced. This practice has become very popular as the cost per plate is minimal, and it is a more hygienic practice than reusing a batch of plates again and again at large gatherings where availability of clean water for the purpose of cleaning is questionable.

The following images are of disposable paper plates and Styrofoam plates.

Paper plate with a metallic finish

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
   4a. Eating From a Thali
   4b. Varieties of Thalis
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
   4a. Eating From a Thali
   4b. Varieties of Thalis
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Colourfully printed paper plate

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
   4a. Eating From a Thali
   4b. Varieties of Thalis
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Styrofoam Plate

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
   4a. Eating From a Thali
   4b. Varieties of Thalis
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Even partition Thalis are being replicated as disposable plates. Indian food with its flavours and variety is best enjoyed in separate sections, not mixed together in a round plate, just as it's done in traditional Thalis. In order to achieve this, some companies are now manufacturing disposable Thalis with 3 to 5 compartments, to separate each item in the Thali, so it can be savoured and enjoyed. These plates are made of Styrofoam, or plastic.

These plates are custom designed for Indian food and have both shallow compartments and/or deep compartments to accommodate all consistencies of food. The manufacturers feel that people enjoy food better in these plates.

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
   4a. Eating From a Thali
   4b. Varieties of Thalis
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Partitioned Styrofoam plate with 3 partitions

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
   4a. Eating From a Thali
   4b. Varieties of Thalis
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Partitioned Styrofoam plate with 5 partitions

Some disposable bowls are available, which are convenient for parties, take-outs from restaurants, catering at railway stations, and food served on trains, flights etc. Thick paper lids keep the food in place. A few examples of these in plastic and aluminium foil are shown below.

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
   4a. Eating From a Thali
   4b. Varieties of Thalis
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Disposable plastic bowls in different shapes

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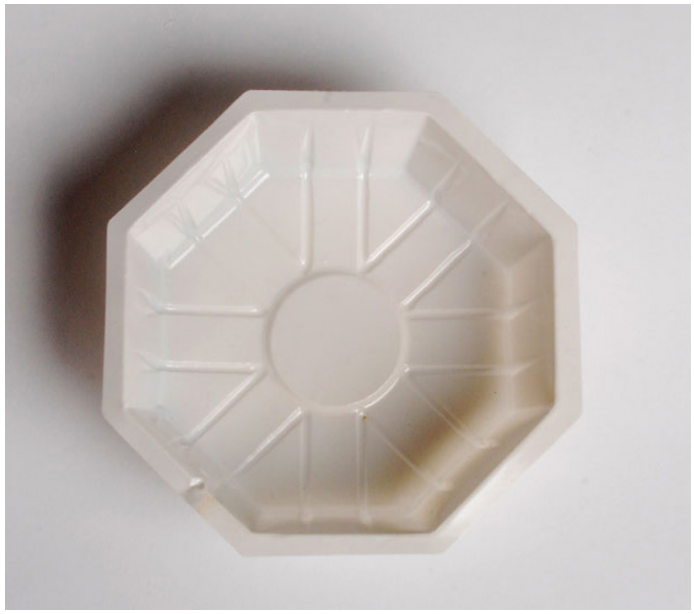
1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
   4a. Eating From a Thali
   4b. Varieties of Thalis
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details



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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
   4a. Eating From a Thali
   4b. Varieties of Thalis
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Disposable aluminium foil bowls of different shapes

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
   4a. Eating From a Thali
   4b. Varieties of Thalis
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

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Source:
https://dsource.in/resource/kitchen-products/utensils-used-eating/varieties-thalis

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
   4a. Eating From a Thali
   4b. Varieties of Thalis
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Design Innovation for Railways

Thali is a hand held tray to serve and eat food on the Indian railways. The way the food is served and eaten on the trains is a very unpleasant experience. Reacting to the fact that millions of passengers travel by rail every day and the time spent inside a train is long, a Thali was developed to enhance the experience of eating on the train. It also makes the life of the people who serve food on the trains easy.

With the above brief, a design student has proposed the following idea for a modern Thali.
[Images source]

Design Resource

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Source:
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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
   5a. Chimta
   5b. Pakkad
   5c. Perforated Spoon
   5d. Ladle
   5e. Palta or Khunti
   5f, 5g
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Additional Items

Any cooking process requires not only utensils to contain the food items and heat sources to transform the ingredients, but also additional items to stir the food and to hold the hot utensils, and after the cooking process is complete to serve the food too. Since there are different types of cooking processes involved there are unique items for unique processes, which were made of iron and brass in earlier times. But nowadays for the same procedure, forms remain more or less the same, but materials have changed to aluminium, stainless steel and also modern manufacturing processes have been adopted.

Chimta

Pakkad

Perforated spoon

Ladle

Palta or the Khunti

Karchi

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Chutney serving dish

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
   5a. Chimta
   5b. Pakkad
   5c. Perforated Spoon
   5d. Ladle
   5e. Palta or Khunti
   5f, 5g
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

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https://dsource.in/resource/kitchen-products/additional-items/chimta

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
   5a. Chimta
   5b. Pakkad
   5c. Perforated Spoon
   5d. Ladle
   5e. Palta or Khunti
   5f, 5g
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Chimta

A Chimta is used to hold a Roti (flat bread) over an open flame to let it fully cook and puff up. It is also used to hold Papads for roasting on an open flame.

The traditional Chimtas were made of cast iron, or brass. Some of them were decorated with embossed designs too. These are nowadays being replaced by utilitarian designs made of stainless steel. Some of the designs sometimes have a thick insulation of plastic for proper grip and a ring at one end for easy suspension from kitchen racks.

A decorated traditional Chimta made of brass

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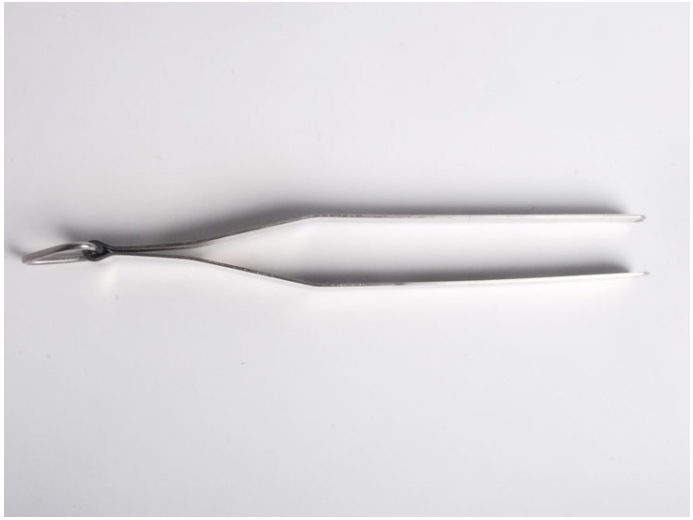
1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
   5a. Chimta
   5b. Pakkad
   5c. Perforated Spoon
   5d. Ladle
   5e. Palta or Khunti
   5f, 5g
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

A modern Chimta design in stainless steel



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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
   5a. Chimta
   5b. Pakkad
   5c. Perforated Spoon
   5d. Ladle
   5e. Palta or Khunti
   5f, 5g
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Pakkad

Pakkad – (Sansi, Sharashi, Sandshi)

Pakkad is a tong with a scissor-like action. They are meant for holding a hot utensil while cooking to stir food, or to remove hot cookware from a stove.

There are several varieties of Pakkads, where the design of the two arms of the Pakkad, and the gripping mechanism vary. Some modern Pakkad designs resemble a four legged insect!

The traditional Sansis/ Pakkads were made of cast iron but the modern-day ones are made of stainless steel or aluminium.

A traditional Pakkad in stainless steel

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
   5a. Chimta
   5b. Pakkad
   5c. Perforated Spoon
   5d. Ladle
   5e. Palta or Khunti
   5f, 5g
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

A modern Pakkad in stainless steel / aluminium

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
   5a. Chimta
   5b. Pakkad
   5c. Perforated Spoon
   5d. Ladle
   5e. Palta or Khunti
   5f, 5g
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
   5a. Chimta
   5b. Pakkad
   5c. Perforated Spoon
   5d. Ladle
   5e. Palta or Khunti
   5f, 5g
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Perforated Spoon

Perforated spoon, Jharo, Jharani or Pauni
A Pauni is a perforated spoon meant for frying.

One end is circular, about 3" in diameter and slightly concave with perforations. The perforations present in a pattern in the spoon are meant to drain liquids such as oils, while retaining the residue for further processing. It is mainly used for deep frying Indian snacks like pooris, samosas, kachoris etc in oil.

They are usually made of stainless steel, aluminium or MS.

The perforations can be circular or slotted and can be of different sizes too. Some of them have a stainless steel wire mesh cup instead of the perforated plate. This is attached to a long handle and is useful in scooping out fried items from hot oil or vegetables from hot water. Modern designs incorporate a wooden or plastic sleeve at the end of the handle for a better grip.

Varieties of perforated spoon or Jharo

Design Resource

Kitchen Products

The Sanctum Sanctorum of the Indian household

by
Madhuri Menon
IDC, IIT Bombay

Source:
https://dsource.in/resource/kitchen-products/additional-items/perforated-spoon

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
   5a. Chimta
   5b. Pakkad
   5c. Perforated Spoon
   5d. Ladle
   5e. Palta or Khunti
   5f, 5g
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
   5a. Chimta
   5b. Pakkad
   5c. Perforated Spoon
   5d. Ladle
   5e. Palta or Khunti
   5f, 5g
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

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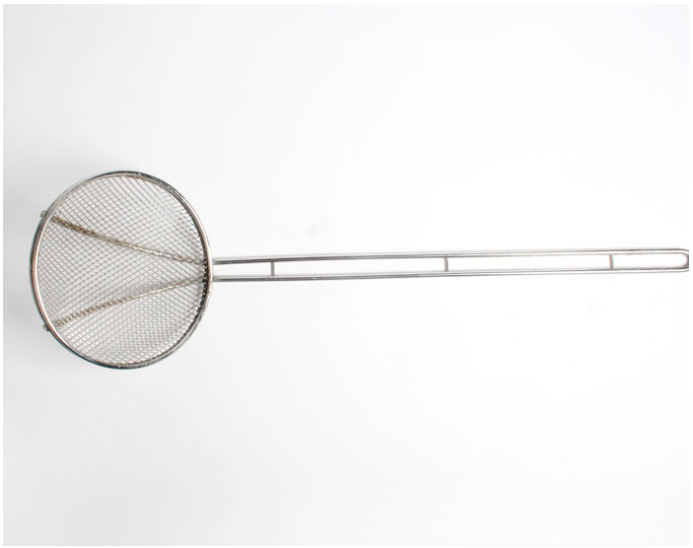

Source:
https://dsource.in/resource/kitchen-products/additional-items/perforated-spoon

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
   5a. Chimta
   5b. Pakkad
   5c. Perforated Spoon
   5d. Ladle
   5e. Palta or Khunti
   5f, 5g
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
   5a. Chimta
   5b. Pakkad
   5c. Perforated Spoon
   5d. Ladle
   5e. Palta or Khunti
   5f, 5g
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Ladle

Hatha/Ladle
Hatha is used for serving or cooking liquid food like daal, curry etc. It has the shape of a large spoon, but rice serving Hatha is flat like hand.

The length of the handle, size and shape of the serving area vary to give a range of Hathas. Some of them may have simple, clean lines and surfaces while some may have uniquely shaped cups with decorative elements on the handle. The simple ones are used for daily requirements and the decorative ones for special occasions.

Generally Hatas, which are used for the purpose of cooking, are made from steel, iron, aluminium, brass, wood and serving Hatas are made of german silver.

Hatha/ladles made of stainless steel

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
   5a. Chimta
   5b. Pakkad
   5c. Perforated Spoon
   5d. Ladle
   5e. Palta or Khunti
   5f, 5g
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Hatha/ladle made of wood

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https://dsource.in/resource/kitchen-products/additional-items/palta-or-khunti

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
   5a. Chimta
   5b. Pakkad
   5c. Perforated Spoon
   5d. Ladle
   5e. Palta or Khunti
   5f, 5g
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Palta or Khunti

This is a type of spatula. It is usually very flat, and has a triangular or square headpiece attached to a long handle. This is very a useful and convenient kitchen tool for turning fish, meat and vegetables and chapatis/parathas, and dosas on a Tawa/ skillet. It is useful too, for stir-frying in an open pan.

Paltas can be made of wood, stainless steel, iron, aluminium etc. The size, shape and thickness of the handle and the headpiece vary a lot. This leads to a range of different shaped Paltas as each one is suitable for a specific cooking method/ food item.

Stainless steel Palta

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
   5a. Chimta
   5b. Pakkad
   5c. Perforated Spoon
   5d. Ladle
   5e. Palta or Khunti
   5f, 5g
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Different types of wooden paltas

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
   5a. Chimta
   5b. Pakkad
   5c. Perforated Spoon
   5d. Ladle
   5e. Palta or Khunti
   5f, 5g
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

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Source:
https://dsource.in/resource/kitchen-products/additional-items/karchi

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
   5a, 5b
   5c. Perforated Spoon
   5d. Ladle
   5e. Palta or Khunti
   5f. Karchi
   5g. Chutney Serving Dish
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Karchi

Karchi - This is a type of ladle that has a long handle. The serving side has a small cup connected to a long handle. It is used for "doling out "or serving curries, daals and gravies.

The length of the handle, size and shape of the cup varies to give a range of Karchis. Some of them may have simple, clean lines and surfaces while some may have uniquely shaped cups with decorative elements on the handle. The simple ones are used on a daily basis and the decorative ones for special occasions.

Stainless steel is the material used to manufacture these in the present day.

Different types of Karchis

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Source:
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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
   5a, 5b
   5c. Perforated Spoon
   5d. Ladle
   5e. Palta or Khunti
   5f. Karchi
   5g. Chutney Serving Dish
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
   5a, 5b
   5c. Perforated Spoon
   5d. Ladle
   5e. Palta or Khunti
   5f. Karchi
   5g. Chutney Serving Dish
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

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Source:
https://dsource.in/resource/kitchen-products/additional-items/chutney-serving-dish

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
   5a, 5b
   5c. Perforated Spoon
   5d. Ladle
   5e. Palta or Khunti
   5f. Karchi
   5g. Chutney Serving Dish
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Chutney Serving Dish

This is a serving dish which carries four different food items at a time and is useful to serve traditional Indian cuisine. This serving dish sometimes has four containers attached together and to a handle or has four removable bowls that fit into a stand fixed to a revolving base. The bowls sometimes have individual cover plates with slots to accommodate serving spoons.

This is used to hold and serve curries, chutneys, pickles, salads, daals etc. It is used less at homes and more at restaurants, weddings and other traditional functions.

This is usually made out of stainless steel. Their design and size vary widely as there are no standards laid out.

Apart from this multiple food serving dish, there are available bowls of various shapes and sizes for serving individual food items. Some of these have just a covering lid; some have more detailing like a handle incorporated into the serving bowl, covered by a lid with a lifting/opening detail. These are used mostly at homes to store individual items like curries, dals, rice, etc. to be placed in a dining space.

A chutney and pickle serving dish

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Source:
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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
   5a, 5b
   5c. Perforated Spoon
   5d. Ladle
   5e. Palta or Khunti
   5f. Karchi
   5g. Chutney Serving Dish
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

A serving dish with a lid

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   - 6a. Three Stone Stove
   - 6b. Chulha
   - 6c. Angithi
   - 6d. Tandoor
   - 6e. Kerosene Stove
   - 6f, 6g, 6h, 6i, 6j
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Stoves

A kitchen stove or a cooking stove, is a kitchen appliance designed for the purpose of cooking food. Kitchen stoves rely on the application of direct heat for the cooking process.

Early Kitchen Stoves

In the early civilizations stoves were fired by wood or charcoal through a hole in the front. Pots with food to be cooked were placed over or hung into holes at the top of the knee-high construction.

In Europe, around the 16th century, people cooked over open fires fueled by wood, which were first on the floor or on low masonry constructions. In the Middle Ages, waist-high brick-and-mortar hearths and the first chimneys appeared, so that cooks no longer had to kneel or sit to tend to foods on the fire. The fire was built on top of the construction; the cooking was done mainly in cauldrons hung above the fire or placed on trivets. The heat was regulated by placing the cauldron higher or lower above the fire.

Attempts were made to enclose the fire to make better use of the heat that it generated and thus reduce the wood consumption. A first step was the fire chamber: the fire was enclosed on three sides by brick-and-mortar walls and covered by an iron plate. This technique also caused a change in the kitchenware used for cooking, for it required flat-bottomed pots instead of cauldrons. Only in 1735 did the first design that completely enclosed the fire appear: the Castrol stove of the French architect François de Cuvilliés was a masonry construction with several fire holes covered by perforated iron plates. It is also known as a stew stove.

Near the end of the 18th century, the design was refined and thus began the quest for better stoves and the design process of producing improved stoves and also the process of experimentation using different fuels as they were discovered, leading to a vast range of cooking stoves that are available in the present day.

In India too, a continuous design development process has been occurring through the ages in kitchen stove design due to the desire to improve lifestyle, fuel efficiency and to also incorporate newer fuels.

In India the traditional kitchen was an area of sanctity with many taboos on who could enter, how they should be dressed and how pollution must be avoided, and the Indian kitchen is a very special area with its own code of conduct. Even today one must remove shoes before entering kitchen, though other things have changed. Modern appliances like cooking ranges and electric gadgets, are slowly appearing in urban Indian homes, and many of these households can afford kitchen help, so traditional methods of cooking /preparing food are still preserved for taste and authenticity.

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a. Three Stone Stove
   6b. Chulha
   6c. Angithi
   6d. Tandoor
   6e. Kerosene Stove
   6f, 6g, 6h, 6i, 6j
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Three stone stove, Chulha, Angithi, Tandoor, Kerosene stove, LPG stove, Electric stove/Hot plate, Solar cooker, Induction stoves, and Microwave ovens are some of the cooking stoves that have been appearing in Indian kitchens from ancient times till present day.

These are presented below.

Three Stone Stove

Chulha

Angithi

Tandoor

Kerosene Stove

LPG Stove

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Electric Stove/Hot Plate

Solar Cooker

Induction Stoves

Microwave Oven

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a. Three Stone Stove
   6b. Chulha
   6c. Angithi
   6d. Tandoor
   6e. Kerosene Stove
   6f, 6g, 6h, 6i, 6j
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a. Three Stone Stove
   6b. Chulha
   6c. Angithi
   6d. Tandoor
   6e. Kerosene Stove
   6f, 6g, 6h, 6i, 6j
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Three Stone Stove

Cooking on a three stone stove is a traditional method of cooking. It is the cheapest stove to manufacture, requiring only three suitable stones of the same height on which a cooking pot is balanced over a fire. This is a very basic stove heated by burning wood or fossil fuels.

Three stone cooking stove
Image source: modi.mech.columbia.edu

An average rural family in a developing country like India spends 20% or more of its income purchasing wood or charcoal for cooking. Living in the city does not help much as the urban poor frequently spend a significant portion of their income on the purchase of wood or charcoal.

This cooking method has many problems:

• Smoke is vented into the home, instead of outdoors, causing health problems.

• Fuel is wasted, as heat is allowed to escape into the open air. This requires more labour on the part of the user to gather fuel and may result in increased deforestation if wood is used for fuel.

• Only one cooking pot can be used at a time.

• The use of an open fire creates a risk of burns and scalds. Especially when the stove is used indoors, cramped

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a. Three Stone Stove
   6b. Chulha
   6c. Angithi
   6d. Tandoor
   6e. Kerosene Stove
   6f, 6g, 6h, 6i, 6j
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

conditions make adults and particularly children susceptible to falling or stepping into the fire and receiving burns. Additionally, accidental spills of boiling water may result in scalding, and blowing on the fire to supply oxygen may discharge burning embers and cause eye injuries.

The World Health Organization has documented a significant number of deaths caused by smoke from home fires. The negative impacts of such a process of cooking can be reduced by using improved cook stoves, improved fuels (e.g. biogas, or kerosene instead of dung), changes to the environment (e.g. use of a chimney), and changes to user behaviour (e.g. drying fuel wood before use, using a lid during cooking).

This cooking stove is still the most popular in the rural areas and to some extent with the urban poor in India.

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a. Three Stone Stove
   6b. Chulha
   6c. Angithi
   6d. Tandoor
   6e. Kerosene Stove
   6f, 6g, 6h, 6i, 6j
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Chulha

Chulha is a traditional Indian cooking stove used for indoor cooking.

Chulha is a U-shaped mud stove made from local clay. After the clay formation is complete, it is finished by covering it with a coat of clay and cow dung mixture. The thickness of the walls is not as important as the dimensions of the fireside. The front of the chulha has an apron. This apron helps hold the fuel to be burnt (usually wood, sticks, cow dung patties, straw, crop waste etc). Once the process of cooking is complete the apron holds the ashes, which are removed later.

To cook on such traditional stoves, one must squat on one's haunches or sit on the floor. Burning of cow dung is supposed to purify the stove. A mixture of clay and cow dung is routinely prepared to coat the cooking surface of the stoves

Food being prepared on a traditional Chulha
[Image source]

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Source:
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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a. Three Stone Stove
   6b. Chulha
   6c. Angithi
   6d. Tandoor
   6e. Kerosene Stove
   6f, 6g, 6h, 6i, 6j
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

A two chulhas stove in a more refined design, with traditional metal utensils and the fuel- wood. [Image source]

Fuel used: Wood and animal dung patties are used as fuel for the Chulha. Animal dung patties are called 'Upla'or dung cakes. [The animal dung of domestic animals like cows, buffalos, goats, sheep, camels, etc is mixed with finely chopped plant materials (stalks called Sarkanda, straw called Tuhari). The mixture is formed into patties (about 6" in diameter and 1" thick) and dried in the hot sun. The plant material depends on the region and the crop being harvested. In North India, mustard stalks, legume stalks, and wheat straw are commonly used. The plant materials add to the density of Upla and make the fire last longer like charcoal.]

Kerosene or Ghee is used as an accelerator on the wood or dung patties to start fire.

Upla or dung cakes
[Image source]

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Source:
https://dsource.in/resource/kitchen-products/stoves/chulha

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a. Three Stone Stove
   6b. Chulha
   6c. Angithi
   6d. Tandoor
   6e. Kerosene Stove
   6f, 6g, 6h, 6i, 6j
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Disadvantage: The major problem with Chulha is that a lot of smoke is produced inside the house by burning wood, dung, and crop waste. The smoke may cause acute respiratory, ear, and eye infections. Smoke also causes breathlessness, chest discomfort, headaches and this can be fatal for children. In urban India, Chulhas are built under a chimney so the smoke rises naturally and escapes through the chimney. Newer designs are being tried to trap toxic particles by using filters etc.

The following is an article to show that the Chulha is a very important and essential item in the kitchens of the masses in India and an attempt to redesign such an iconic stove, to solve all its inherent problems is one of the social concerns of a design company Philips.

Indian Chulha
This simple stove promises to help reduce the 1.6 million fatalities associated each year with indoor cooking, 25 percent in India alone.

By Ernest Beck

The Chulha features two potholes and an easy-to-clean chimney. Photo courtesy Philips Design

In Hindi the word "Chulha" means stove, but for millions of low-income people in developing countries, a stove is a pile of stones heated by an open wood- or cow-dung-burning fire in their homes. This method of cooking poses a serious health hazard: indoor air pollution resulting from the burning of biomass fuels is a leading cause of respiratory diseases. In fact, the World Health Organization estimates that 1.6 million people — mostly women and children, who are more likely to cook or to be confined in the home while cooking is done — die annually

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a. Three Stone Stove
   6b. Chulha
   6c. Angithi
   6d. Tandoor
   6e. Kerosene Stove
   6f, 6g, 6h, 6i, 6j
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

from indoor air pollution; India alone accounts for 25 percent of such deaths. That's why Philips's Philanthropy by Design unit, working with the company's Indian office and the organization ARTI (Appropriate Rural Technology Institute), chose for its first project to create a stove that wouldn't taint the air. "The goal was a low-tech, low-cost, low-smoke device that respects local traditions and culinary habits," says Simona Rocchi, senior director for sustainable design at Philips and a member of the core design team for the Chulha project, which won the 2009 INDEX Award in the Home category.

The Chulha is a simple, modular concrete-block stove covered in brown clay. It features two potholes: one for circulating hot air for steamed foods such as rice, and the other for heating flat pans holding chapati (fried bread) and similar dishes. The modular format was chosen to facilitate production, assembly, installation and the replacement of parts. As the design progressed, two models of the Chulha emerged to accommodate different income levels: one version priced at 9 to 11 Euros ($13.10 to $16) has a double oven and hotbox; a pricier model, at 13 to 15 Euros ($18.90 to $21.80), includes a steamer. Both stoves feature a decorative pattern common in India, which could be described in marketing terms as a lifestyle upgrade. After all, notes Rocchi, "Design solutions for poor people don't have to be ugly."

A critical design element of the Chulha is a chimney fitted with a special filtering device made of slotted clay tablets to trap toxic particles. Many stoves currently in use don't have chimneys at all, and those that do are often cleaned from the domicile's roof, an onerous and accident-prone task usually undertaken by women. The Chulha's chimney is equipped with a small trap door that affords easier cleaning from within the house. Initial tests suggest that the Chulha reduces indoor air pollution by up to 90 percent compared with indoor open cooking-fires.

Another goal of the project is to enable local people and entrepreneurs — especially women-run enterprises — to produce and sell the Chulha, based on a special training kit and open-source manufacturing plans made available by Philips. An estimated 1,000 new stoves will be distributed over the next year in Pune, India, to test the product and its social impact, and a second pilot project will begin soon in Bangalore. Rocchi says reduced-smoke stoves could be applied in Bangladesh and Pakistan — countries that have culinary traditions similar to India's, but substantial adaptations would be required to fit the particular cuisines and rounder house shapes (necessitating a different kind of chimney) of potential users in Latin America and Africa.

Unmesh Kulkarni and Praveen Mareguddi from Philips Design team India were awarded the INDEX award for the home category in 2009 for their design of this Chulha.

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Source:
https://dsource.in/resource/kitchen-products/stoves/angithi

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a. Three Stone Stove
   6b. Chulha
   6c. Angithi
   6d. Tandoor
   6e. Kerosene Stove
   6f, 6g, 6h, 6i, 6j
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Angithi

Angithi is a secondary stove to the primary stove Chulha.
Different forms of Angithis made of copper, iron and stainless steel are shown below.

[Image source]

[Image source]

[Image source]

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Kitchen Products

The Sanctum Sanctorum of the Indian household

by
Madhuri Menon
IDC, IIT Bombay

Source:
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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a. Three Stone Stove
   6b. Chulha
   6c. Angithi
   6d. Tandoor
   6e. Kerosene Stove
   6f, 6g, 6h, 6i, 6j
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

The exterior of an Angithi looks like a pail or a bucket. Usually a galvanized steel bucket is converted to an Angithi to minimize rust. A small opening is made near the bottom of the bucket. The inside of the bucket is coated with a mixture of concrete and clay to form a uniform cylinder at the centre of it. An iron grate is installed halfway through the length of the cylinder. Fuel like charcoal is added from the top and supported by the iron grate on the top half of the cylinder. Paper, dried twigs are fed through the opening on the bottom to start a fire and to light the charcoal and Upla. On the top surface three wedges (about 1" high) are created for the cookware to rest on. All the exposed surface of the concrete/clay structure is routinely coated with a mixture of clay and cow dung.

Fuel used: Initially, the Angithi is fired up with a small amount of charcoal and pieces of Upla or dung cakes. Once charcoal catches fire, mined coal (Pathar Koyla) is added. After loading coal, the Angithi is put outside to prevent hazardous fumes from spreading inside the house. After the fumes have ceased, the Angithi is brought back inside for cooking.

The Angithi is more than a cooking stove. The handle of the bucket of the Angithi made it easy to be carried from one place to another and it was therefore a 'mobile stove'.

Of the many simple daily use objects that have been sacrificed at the altar of modern living the humble Angithi, the earthen cooking stove that adorned each and every home in north India is one of them. Every home in Punjab had an Angithi till the mid-sixties. In the cold winter of Punjab the Angithi would become the hearth of the homes as it was kept inside to warm the rooms like a room heater.

Nowadays, except for some remote rural homes, it is not found anywhere.

The simple Angithi will always remain a symbol of warmth, the true heart of each home, as families gather around it during meal times to partake in piping hot food.

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Source:
https://dsource.in/resource/kitchen-products/stoves/tandoor

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a. Three Stone Stove
   6b. Chulha
   6c. Angithi
   6d. Tandoor
   6e. Kerosene Stove
   6f, 6g, 6h, 6i, 6j
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Tandoor

Tandoor is a traditional Indian clay oven, with rounded sides, standing about 5 feet high, used in cooking and baking. The Tandoor is used for cooking in a number of countries other than India like Azerbaijan, Turkey, Iran, Pakistan, Afghanistan, the Balkans, the Middle East, and Bangladesh etc.

The oldest examples of a Tandoor were found in the Harappa and Mohenjo Daro settlements of the ancient Indus Valley Civilization. In Sanskrit, the Tandoor was referred to as Kandu. The Tandoor was popularised during Muslim reign in South Asia.

Pre-fired clay tandoori oven
[Image source]

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a. Three Stone Stove
   6b. Chulha
   6c. Angithi
   6d. Tandoor
   6e. Kerosene Stove
   6f, 6g, 6h, 6i, 6j
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

[Image source]

[Image source]

A mobile clay Tandoor oven and its cross sectional view showing the clay pot arrangement in an outer steel casing with castors.

The Tandoor oven relies on the natural cooking medium - "charcoal". The intense heat inside, created by the hot coals cooks the meat, seafood or chicken pieces very quickly. The food becomes crispy on the outside while remaining juicy inside. The Tandoor is used for cooking certain types of Iranian, Afghan, Pakistani and Indian foods. Tandoori chicken, chicken tikka and bread varieties like Tandoori roti and naan which are very popular in Indian cuisine. The word Tandoori means "pertaining to the Tandoor" and is used to describe a dish cooked in a Tandoor. Tandoori cooking does not use much oil or ghee and therefore is preferred when one is pursuing a low calorie diet.

It is believed that, it is the charcoal fire in the Tandoor that gives the food its smoky flavour which cannot be replicated in any modern oven. It is also impossible to create the exact flavour and texture of Tandoori foods without a Tandoor oven.

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   - 6a. Three Stone Stove
   - 6b. Chulha
   - 6c. Angithi
   - 6d. Tandoor
   - 6e. Kerosene Stove
   - 6f, 6g, 6h, 6i, 6j
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

A Tandoor in use - making naan and baking meat and vegetables on skewers.

The heat for a Tandoor was traditionally generated by a charcoal fire or wood fire, burning within the Tandoor itself, thus exposing the food to live-fire. Cooking temperatures in a Tandoor can approach 480°C (900°F), and it is common for Tandoor ovens to remain lit for long periods to maintain the high cooking temperature. The Tandoor design is something of a transitional form between a makeshift earth oven and the horizontal-plan masonry oven.

A traditional Tandoori oven has to be seasoned. A paste is made of spinach and applied to the inner surface and left to dry. An emulsion of mustard oil, buttermilk, jaggery and salt is applied over the spinach. A small fire is lit and the temperature is allowed to rise gradually until the emulsion peels away from the walls of the Tandoor. A brine solution is sprinkled on the inner walls to facilitate the sticking of bread like naans to the sides. To know if the oven temperature is optimum a naan is stuck to the sides, if it falls off, the oven is not hot enough. It is important to marinate the meats and paneers (cottage cheese) cooked in a Tandoor as the process is very drying and also to imparts flavours.

In India, the Tandoor is also known by the name of **Bhatti**.

The Tandoor is a very important fixture in many Indian restaurant kitchens around the world, as it is very versatile and can be used as an oven and a grill. The flavour that it imparts to the food from the hot charcoal is very delicate and delicious. Some modern-day Tandoors use electricity or gas instead of charcoal.

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Source:
https://dsource.in/resource/kitchen-products/stoves/kerosene-stove

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a. Three Stone Stove
   6b. Chulha
   6c. Angithi
   6d. Tandoor
   6e. Kerosene Stove
   6f, 6g, 6h, 6i, 6j
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Kerosene Stove

Kerosene was used initially in lanterns for the purpose of lighting.
In countries such as India, kerosene is the main fuel used for cooking, especially by the poor, and kerosene stoves have replaced traditional wood-based cooking appliances. In Hindi, kerosene is called 'Mitti ka tel', meaning oil (out) of the earth.

In 1892, Frans Wilhelm Lindqvist a factory mechanic in Stockholm, Sweden developed the first commercially manufactured portable indoor cooking stove called 'Primus'. The Primus employs a special burner where a tube is heated by lighting alcohol spirit. Together with partner J.V. Svensson, Lindqvist established the Primus brand of stove, which quickly developed into a worldwide market leader.

Primus stove
[Image source]

The kerosene burning Primus stoves and their imitators were made of brass, which had used a wick to supply liquid fuel to the burner by capillary action. The Primus burner vaporized the fuel in a loop of pipe which rose up from the fuel tank at the stove's base, and which was pre-heated with alcohol or methylated spirits before being combusted in the burner. Initial pressure is provided by a small, hand operated pump integrated into the stove's fuel tank. The flame on a Primus stove is adjusted by using the pump to increase the pressure in the tank to make the flame larger, or by venting the tank to reduce the pressure and make the flame smaller.

Before Primus stoves existed, kerosene stoves were constructed in the same manner as oil lamps, which use a wick to draw fuel from the tank to the burner and this process produces a great deal of soot due to incomplete

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a. Three Stone Stove
   6b. Chulha
   6c. Angithi
   6d. Tandoor
   6e. Kerosene Stove
   6f, 6g, 6h, 6i, 6j
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

combustion. The Primus stove's design, which uses pressure and heat to vaporize the kerosene before ignition, results in a hotter, more efficient stove that does not soot. Because it did not use a wick and did not produce soot, the Primus stove was advertised as the first "sootless" and "wickless" stove.

The efficient Primus stove quickly earned a reputation as a reliable and durable stove for everyday use, and it performed especially well under adverse conditions and was used extensively by famous mountaineers on their expeditions too.

Primus-style stoves were made in a variety of sizes and styles, and many were designed to be disassembled for storage and transportation in a separate case.

During the late 1970s, kerosene wick stove was introduced in India.
There are two types of kerosene stoves - the wick type and the pressure type. Wick stoves can be with either multiple small wicks, or a single wick standing on its edge, or a standard heater-type circular wick.

[Image source]

[Image source]

In kerosene pressure stoves the generator is preheated by burning alcohol in a cup, then the stove is lit. Unlike the silent operation of a wick type stove, the pressure stoves produce quite a bit of noise when in use. Pressure stoves have no moving parts, except for the pressure pump. The burners are usually made of solid brass as they last long and function efficiently. Only kerosene is used as a fuel indoors as it produces almost no carbon monoxide on burning. The only problem with pressure stoves is keeping the jet clean, but that can be taken care of if the fuel tank is rinsed out once a year and only filtered fuel is used.

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The Sanctum Sanctorum of the Indian household

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https://dsource.in/resource/kitchen-products/stoves/kerosene-stove

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a. Three Stone Stove
   6b. Chulha
   6c. Angithi
   6d. Tandoor
   6e. Kerosene Stove
   6f, 6g, 6h, 6i, 6j
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Commercial stoves using kerosene have been manufactured in India to make the cooking process quick and convenient. These stoves are highly durable, extremely fuel efficient, and easy to maintain and are at times manufactured to suit customer requirements. These multipurpose commercial stoves are available with more than one burner like single burner stoves, 2, or 4 Burner Stoves, based on the customer's needs. These are mainly used in hotels, Community Cooking Centres, large social gatherings like weddings, industry canteens etc.

Double burner commercial kerosene stove
[Image source]

The percentage of households using kerosene stoves in their kitchens in India is shrinking. Users who do not need the portability of a kerosene stove and who are financially stable are moving towards LPG stoves.

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Source:
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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a, 6b, 6c, 6d, 6e
   6f. LPG Stove
   6g. Electric Stove/Hot Plate
   6h. Solar Cooker
   6i. Induction Stoves
   6j. Microwave Oven
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

LPG Stove

The first gas stoves were developed as early as the 1820s in UK, but these remained isolated experiments. James Sharp patented a gas stove in Northampton, England in 1826 and opened a gas stove factory in 1836.

The first gas stoves were rather cumbersome, but soon the oven was integrated into the base and the size was reduced to fit in better with the rest of the kitchen furniture. In the 1910s, producers started to enamel their gas stoves for easier cleaning. A high-end gas stove called the AGA cooker was invented in 1922 by Swedish Nobel prize winner Gustaf Dalen.

Since then numerous varieties of stoves have evolved and from a simple stove, cooking ranges which include ovens, grills along with burners have emerged. This design evolution has touched the Indian shores too. Presently there's hardly any typical Indian gas stove that one sees in the market unlike the Chulha, Tandoor etc.

LPG Stoves and cooking ranges in India:
The 1991 National census showed the following distribution of fuel used in Indian households for cooking.

Wood and crop waste: 62%, Animal Dung: 15%, LPG: 7.9%, Kerosene: 7.2%, Coal 3.5%, Charcoal: 0.8%, Miscellaneous: 3.7%

Miscellaneous includes Electric stoves (hot plates), Bio-gas stoves (Gas produced from animal dung).

Early gas /LPG stoves
[Image source]

As times changed, the face of the Indian kitchen changed too. Gas stoves or cooking ranges are favourites in Indian kitchens. From 'rasoi', Indian kitchens have graduated to 'modular 'at least in urban India. Using a cooking

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a, 6b, 6c, 6d, 6e
   6f. LPG Stove
   6g. Electric Stove/Hot Plate
   6h. Solar Cooker
   6i. Induction Stoves
   6j. Microwave Oven
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

range cuts down on space, but it also cuts down on energy use. Also the environmental debate is on top of everyone's agenda. With most aspects of people's lives today revolving around aesthetics and effectiveness, it seems only natural to expect the same standards from kitchen appliances too.

Also LPG stoves provide the freedom to stand in the kitchen for the cooking process without the inconvenience of squatting or sitting on the floor to cook meals.

In 1970s, large oil corporations started to produce LPG (Liquid Petroleum Gas) in cylinders. LPG consists of about 80% butane and 20% propane. When LPG stoves started entering the kitchens in India they have become the most popular stoves in urban India. Piped natural gas facility is now available in most cities which has replaced the LPG cylinders and is truly a better option as supply is continuous and cylinders need not be replaced periodically. The flavour induced by burning wood and Upla(dung cakes) or kerosene does not exist in the case of LPG which was a tremendous improvement.

Some examples of LPG stoves that one can find in the Indian market are shown below.

Three burner gas stove
[Image source]

5 burner LPG stove with pan supports
[Image source]

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Aesthetically designed sleek LPG stove with a smooth glass top and brass burners
[Image source]

Source:
https://dsource.in/resource/kitchen-products/stoves/lpg-stove

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a, 6b, 6c, 6d, 6e
   6f. LPG Stove
   6g. Electric Stove/Hot Plate
   6h. Solar Cooker
   6i. Induction Stoves
   6j. Microwave Oven
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Cook tops or stoves and hobs are aesthetically contoured. Most have a stainless steel body which is very easy to clean and remains rust free. Some have 2, 3, 5 Gas burners including one Triple Ring (Wok) Burner suitable for spherical vessels and for faster cooking. The remaining burners have one row of flame. There also exists a large centre distance between the burners. Some stoves have sheet metal 'Individual Pan Supports' for convenience during cooking/ cleaning. The design emphasis is on a sturdy yet elegant single body construction. Spring loaded toughened Glass Top Cover is also available as an option in some stoves. There is an option to light these manually with a match or with a multi spark Auto-Ignition.

Cooking Ranges:
Various cooking ranges are available in the Indian market. Sunflame, Elba, Glen, Faber Heatkraft are some companies that manufacture gas cooking ranges in India.

Cooking ranges have 4 burners, one mini triple ring, one large and two medium burners. They also have auto ignition for lighting the burners. An oven and grill along with a timer and oven lamp too are provided in a cooking range. The body of it is mostly made of stainless steel.

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Source:
https://dsource.in/resource/kitchen-products/stoves/lpg-stove

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a, 6b, 6c, 6d, 6e
   6f. LPG Stove
   6g. Electric Stove/Hot Plate
   6h. Solar Cooker
   6i. Induction Stoves
   6j. Microwave Oven
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Shown below are examples of cooking ranges available in India.

[Image source]

[Image source]

[Image source]

Some cooking ranges have other features like automatic or pilot ignition systems with 3, 4, 5 gas burners and an oven with a gas heating system. They can also have a combined oven and grill compartment, different oven capacities. Some also have features like interior lights, rotisserie and safety switches. Some have silver-brass or cast iron or enamel burner-caps. Some come with smooth top burners which makes them easy to clean. Some may also have a dish warmer.

Thus the options that are available to a modern consumer are far too superior and varied compared to the humble beginnings of the LPG gas stove.

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Source:
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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   - 6a, 6b, 6c, 6d, 6e
   - 6f. LPG Stove
   - 6g. Electric Stove/Hot Plate
   - 6h. Solar Cooker
   - 6i. Induction Stoves
   - 6j. Microwave Oven
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Electric Stove/Hot Plate

A hot plate is a portable tabletop stove that uses one or two electric heating elements. Electricity is the source of power and the heat generated in the heating element is what cooks the food.

A hot plate can be used as a standalone appliance, when cooking for a single or two individuals. Hot plates are used in food preparation, generally in locations where a normal sized kitchen stove would not be convenient or practical due to space constraints or lesser cooking requirements. But it is often used along with a cooking range or LPG gas stove to decrease the time required to cook large quantities of food.

Though a hot plate is easily moved from one location to another, care must be taken to ensure that there is sufficient clearance between the appliance location and any combustible materials. Since the heating elements are exposed or uncovered, a hot plate should not be located in a place where the appliance would be accessible to children and others unfamiliar with its operation.

A hot plate is used not only for cooking but also for heating or warming food. Since it mainly uses electricity, it is pollution free, and the pressures of procuring LPG cylinders for the purposes of cooking are avoided.

Essential requirements of a hot plate are that the stove body should be shockproof, stable, easy to handle and is maintenance free. Most of them have a powder coated MS body with a rigid frame. A heat regulator on the hotplate maintains a range of preset temperatures, automatically. The heating surface is made of a high performance, tubular element with a round cross section.

Since the heating surface is flat, it is preferable to use flat bottomed utensils, so there is no heat loss.

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Source:
https://dsource.in/resource/kitchen-products/stoves/electric-stovehot-plate

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a, 6b, 6c, 6d, 6e
   6f. LPG Stove
   6g. Electric Stove/Hot Plate
   6h. Solar Cooker
   6i. Induction Stoves
   6j. Microwave Oven
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Hot plates are available in single burner and two burner models too as shown below.

[Image source]

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Source:
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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a, 6b, 6c, 6d, 6e
   6f. LPG Stove
   6g. Electric Stove/Hot Plate
   6h. Solar Cooker
   6i. Induction Stoves
   6j. Microwave Oven
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Solar Cooker

A solar cooker is a device which uses sunlight- a renewable energy as its fuel source. They use no fuel, other than sunlight and hence they incur no cost. Humanitarian organizations are promoting their use worldwide to help reduce deforestation and desertification, caused by using wood as fuel for cooking. Solar cookers are a form of outdoor cooking and are often used in situations where minimal fuel consumption is important, or the danger of accidental fires is high.

Solar cooker
[Image source]

Working Principle
There are a variety of types of solar cookers, over 65 major designs and hundreds of variations of them. The basic principles of all solar cookers are:

1. Concentrating sunlight: Some devices, usually a mirror or some type of reflective metal, are used to concentrate light and heat from the sun into a small cooking area, making the energy more concentrated and therefore more potent.

2. Converting light to heat: By using black on the inside of a solar cooker, as well as by using certain materials for pots, the effectiveness of turning light into heat is improved. For example, a black pan will absorb almost all of

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a, 6b, 6c, 6d, 6e
   6f. LPG Stove
   6g. Electric Stove/Hot Plate
   6h. Solar Cooker
   6i. Induction Stoves
   6j. Microwave Oven
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

the sun's light and turn it into heat, substantially improving the effectiveness of the cooker.

3. Trapping heat: Isolating the air inside the cooker from the air outside in a solar cooker is important for its functioning. Using a clear material, like a plastic sheet or a glass cover, will allow light to enter, but once the light is absorbed and converted to heat, the plastic sheet or glass cover will trap the heat inside. This makes it possible to reach similar high temperatures on cold and windy days as on hot days.

Advantages

• Solar ovens/stoves can be used to prepare anything that can be made in a conventional oven or stove—from baked bread to steamed vegetables to roasted meat. Since solar ovens are placed outside, they do not contribute unwanted heat inside houses.

• Solar cookers use no fuel, which means that their users do not need to fetch or pay for firewood, gas, electricity, or other fuels.

• Solar cookers do not produce any smoke, unlike the typical wood fired cooking stoves which produce carbon monoxide, noxious fumes, ashes and soot, which make a home dirtier.

• Unlike cooking over an open fire, children cannot be burned by touching solar cookers, which are made from the cardboard or plastic and do not get hot. Unlike all fuel-based cooking arrangements, solar cookers are not fire hazards.

Disadvantages

• Solar cookers take a long time to cook food compared to an oven. Using a solar cooker therefore requires that food preparation be started several hours before the meal. However, it requires less hands-on time cooking, so this is often considered a reasonable trade-off.

• Cooks may need to learn special cooking techniques to cook common foods, such as fried eggs or flatbreads like chapatis. It may not be possible to safely or completely cook some thick foods, such as large roasts, loaves of bread, or pots of soup, particularly in small panel cookers; one may need to divide these into smaller portions before cooking.

Solar cookers are less usable in cloudy or rainy weather, so some fuel-based backup heat sources must still be available to cook food at these times. Some solar cooker designs are affected by strong winds, which can slow the cooking process, cool the food, and disturb the reflector.

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Source:
https://dsource.in/resource/kitchen-products/stoves/solar-cooker

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a, 6b, 6c, 6d, 6e
   6f. LPG Stove
   6g. Electric Stove/Hot Plate
   6h. Solar Cooker
   6i. Induction Stoves
   6j. Microwave Oven
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Solar cookers in India

India is a country with many villages still unconnected to the power grid and with millions of people still depending on kerosene lamps for lighting and firewood for cooking. Using renewable energy in the form of solar energy in a country with 300 days of bright sunshine is very relevant in this age of rising energy costs and increasing environmental damage. Though the Ministry of New and Renewable Energy has tried to make the solar cooker available to villages, the slow cooking time and the lack of awareness among villagers have resulted in the solar cooker not being widely accepted, although it comes with a hefty subsidy in excess of 50%. Considering the huge amount of capital the government can save by adopting solar energy in rural India, it is necessary for the government to popularise it in an effective way.

[Image source]

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Kitchen Products

The Sanctum Sanctorum of the Indian household

by
Madhuri Menon
IDC, IIT Bombay

Source:
https://dsource.in/resource/kitchen-products/stoves/solar-cooker

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a, 6b, 6c, 6d, 6e
   6f. LPG Stove
   6g. Electric Stove/Hot Plate
   6h. Solar Cooker
   6i. Induction Stoves
   6j. Microwave Oven
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Types of solar cookers

Panel type solar cookers
[Image source]

Panel type solar cookers
[Image source]

Parabolic type solar cooker
[Image source]

Box type solar cooker
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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a, 6b, 6c, 6d, 6e
   6f. LPG Stove
   6g. Electric Stove/Hot Plate
   6h. Solar Cooker
   6i. Induction Stoves
   6j. Microwave Oven
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Hybrid solar cooker:
A hybrid solar oven is a solar box cooker equipped with a conventional electrical heating element for cooking on cloudy days or at night time. Hybrid solar ovens are therefore advantageous. However, they lack the cost advantages of solar cookers, and so they have not caught on as much in the third world countries where there is an extreme lack of electricity or fuel sources.

Hybrid solar cooker
[Image source]

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a, 6b, 6c, 6d, 6e
   6f. LPG Stove
   6g. Electric Stove/Hot Plate
   6h. Solar Cooker
   6i. Induction Stoves
   6j. Microwave Oven
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Induction Stoves

An induction stove uses induction heating for cooking. An induction stove transfers electrical energy by induction from a coil of wire in the stove into a utensil made of a material which must be electrically conductive and ferromagnetic.

Induction stove may be a built-in hob, part of a range, or a standalone unit. Built-in units usually have multiple elements, similar to separate burners on an LPG cooking range. Stand-alone induction modules too exist with a single-element, or sometimes have two elements. The design of all such heating elements is similar. An electromagnet is sealed beneath a heat-resisting glass-ceramic sheet. This glass sheet can be easily cleaned. When the stove is turned on the utensil is placed on the ceramic glass surface and begins to heat up, along with its contents.

Two sensor induction stove
[Image source]

Portable induction stove
[Image source]

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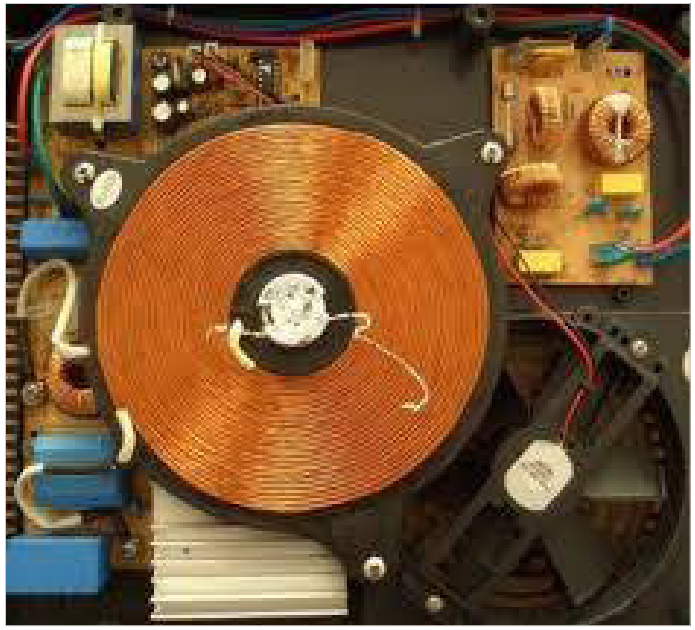
1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a, 6b, 6c, 6d, 6e
   6f. LPG Stove
   6g. Electric Stove/Hot Plate
   6h. Solar Cooker
   6i. Induction Stoves
   6j. Microwave Oven
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Working

In this type of stove a coil of wire is mounted under the cooking surface, and a large alternating current is passed through it. This current creates a changing magnetic field. When an electrically conductive utensil is brought close to the cooking surface, the magnetic field induces an electrical current, called an "eddy current", in the utensil. The eddy current, flowing through the electrical resistance, causes electrical power to be dissipated as heat; the utensil gets hot and heats its contents by heat conduction.

The cooking utensil is typically made from stainless steel or iron, which is much less conductive and is ferromagnetic. The copper coil, present under the cooking surface on the other hand, is made from wire known as litz wire, which is a bundle of many tiny wires in parallel. This coil has many turns, and the bottom of the utensil effectively forms a single shorted turn. This arrangement forms a transformer that steps down the voltage and steps up the current. The resistance of the utensil, as viewed from the primary coil, appears larger. That, in turn, means that most of the energy becomes heat in the high-resistance steel utensil, while the driving coil remains cool.



Inside view of an induction stove. The large copper coil forms the magnetic field, a cooling fan is visible below it, and main and auxiliary power supplies surround the coil.
[Image source]

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a, 6b, 6c, 6d, 6e
   6f. LPG Stove
   6g. Electric Stove/Hot Plate
   6h. Solar Cooker
   6i. Induction Stoves
   6j. Microwave Oven
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Since heat is being generated by an induced electric current, the unit can detect whether cookware is present (or whether its contents have boiled dry) by monitoring how much power is being absorbed. That allows such functions as keeping a utensil at minimal boil or automatically turning an element off when the utensil is removed from it.

Materials used for the cooking surface and the utensils/cookware
The cooking surface is made of a material which is a poor heat conductor, so only minimal heat is transferred from the utensil to the cooking surface. In a normal operation the cooking surface stays cool enough to touch without injury even after the cooking utensil is removed.

Induction hobs (cook tops) work well with any pans with a high ferrous metal content at the base. Cast iron pans and any black metal or iron pans will work on an induction hob.
The reason why iron or steel cookware works on an induction stove and aluminium or copper cookware does not is because of the permeability and resistivity of the material. Aluminium or copper cookware is more conductive and nonmagnetic. That means that the effective resistance of such utensils is much lower, and so the induction stove will not work efficiently with such utensils. The heat that can be produced in a utensil is a function of the surface resistance. A higher surface resistance produces more heat for similar currents. This is a "figure of merit" that is used to rank the suitability of a material to be used for manufacturing induction heating cookware.

Advantages
Induction stoves are safer to use than conventional stoves because there are no open flames and the element itself reaches only the temperature of the cooking vessel and only the utensil generates heat. Induction stoves are easy to clean because the cooking surface is flat and smooth, even though it may have several heating zones. Since the cooking surface is not directly heated, spilt food does not burn on the surface.

They have a definite advantage over conventional gas flame and electric stoves, as they provide rapid heating, improved thermal efficiency, and greater heat consistency, yet with precise control. The usage of these stoves is ideal in situations where a hotplate would be dangerous, as an induction stove, itself creates no heat.

A far greater advantage is that these stoves are almost flush with any cooking platform, and they can be easily accessed and used by disabled people in wheelchairs, unlike other types of stoves.

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a, 6b, 6c, 6d, 6e
   6f. LPG Stove
   6g. Electric Stove/Hot Plate
   6h. Solar Cooker
   6i. Induction Stoves
   6j. Microwave Oven
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Microwave Oven

A microwave oven, or simply a microwave, is a kitchen appliance that heats food by dielectric heating. This is achieved by using microwave radiation to heat polarized molecules within the food. This excitation is fairly uniform, leading to food being more evenly heated throughout (except in dense objects) when compared to what occurs in other cooking techniques.

Microwave oven
[Image source]

History
The heating effect of microwaves was discovered accidentally in 1945 by Percy Spencer, an American self-taught engineer from Howland, Maine, who was building magnetrons for radar sets with the American company Raytheon. He was working on an active radar set when he noticed that a peanut chocolate bar he had in his pocket started to melt. The radar had melted his chocolate bar with microwaves.

On October 8, 1945, Raytheon filed a US patent for Spencer's microwave cooking process and an oven that heated food using microwave energy was placed in a Boston restaurant for testing. In 1947, the company built the Radarange, the first commercial microwave oven in the world.

Through the 1960's several companies developed different configurations of the microwave ovens and through Trade Shows began a rapid growth of the market for home microwave ovens. By the late 1970s the technology had improved to the point where prices were falling rapidly. Often called "electronic ovens" in the 1960s, the

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a, 6b, 6c, 6d, 6e
   6f. LPG Stove
   6g. Electric Stove/Hot Plate
   6h. Solar Cooker
   6i. Induction Stoves
   6j. Microwave Oven
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

name "microwave ovens" later became standardized, often now referred to informally as simply "microwaves." Formerly found only in large industrial applications, microwave ovens were increasingly becoming a standard fixture of most kitchens. The rapidly falling price of microprocessors made it possible for adding electronic controls which made these ovens easier to use.

In India most of the modern microwave ovens are compact, well designed and provide a wide array of customizable cooking programmes to cook different kinds of dishes instantly. Microwave cooking not only helps one to save on electricity and oil but also gives food a richer aroma and more wholesome flavours.

Nowadays in India there are several well-known brands of microwave ovens like IFB, Samsung, LG, Godrej etc. along with several local brands.

Principle of working

A microwave oven works by passing non-ionizing microwave radiation, usually at a frequency of 2.45 gigahertz (GHz)—a wavelength of 122 millimetres (4.80 in)—through the food. Microwave radiation is between common radio and infrared frequencies. Water, fat, and other substances in the food absorb energy from the microwaves in a process called dielectric heating. Many molecules (such as those of water) are electric dipoles, meaning that they have a positive charge at one end and a negative charge at the other, and therefore rotate as they try to align themselves with the alternating electric field of the microwaves. This molecular movement represents heat which is then dispersed as the rotating molecules hit other molecules and put them into motion.

Design

A microwave oven consists of:

• A high voltage power source, that is a simple transformer or an electronic power converter, which passes energy to the magnetron

• A high voltage capacitor is connected to the magnetron, transformer and via a diode to the case.

• A cavity magnetron, which converts high-voltage electric energy to microwave radiation

• A magnetron control circuit (usually with a microcontroller)

• A waveguide (to control the direction of the microwaves)

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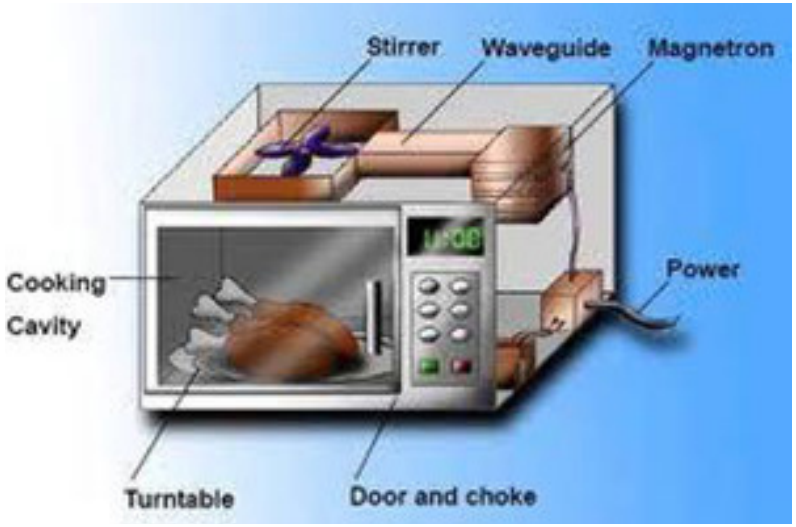
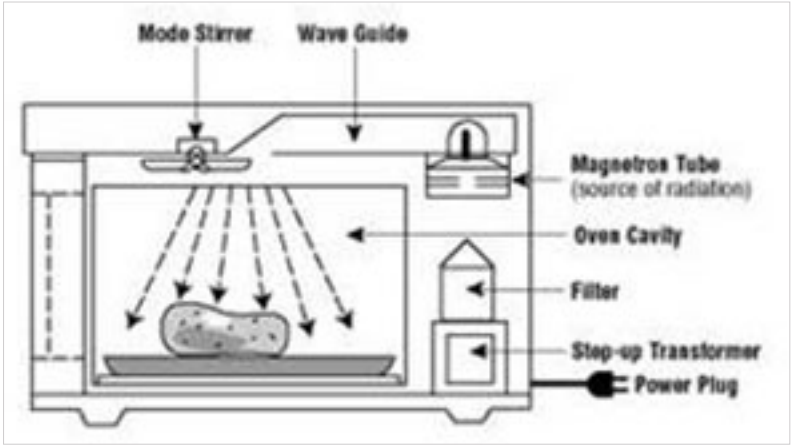
1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a, 6b, 6c, 6d, 6e
   6f. LPG Stove
   6g. Electric Stove/Hot Plate
   6h. Solar Cooker
   6i. Induction Stoves
   6j. Microwave Oven
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details



Parts of a microwave oven
[Image source]



Functioning of a microwave oven
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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a, 6b, 6c, 6d, 6e
   6f. LPG Stove
   6g. Electric Stove/Hot Plate
   6h. Solar Cooker
   6i. Induction Stoves
   6j. Microwave Oven
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Nearly all modern microwave ovens have a control panel with an LED, liquid crystal or vacuum fluorescent display (early models used an analogue dial-type timer).

Numeric buttons for entering the cooking time, a button for selecting the power level (usually decrementing by 10 from 100 to 50, or using words such as High, Medium High and Medium) and a Defrost button are present in most microwaves ovens. Other buttons may be present which name the type of food to be cooked, such as meat, fish, poultry, vegetables, frozen vegetables etc. which when pressed cook the item for a pre-programmed time.

The cooking chamber prevents the microwaves from escaping. All microwave energy remains inside the cooking cavity. When the door is opened, or the timer reaches zero, the microwave energy stops--just as turning off a light switch stops the glow of the lamp.

The oven door usually has a window for easy viewing, but the window has a layer of conductive mesh some distance from the outer panel to maintain the shielding. Because the size of the perforations in the mesh is much less than the microwaves' wavelength, most of the microwave radiation cannot pass through the door, while visible light (with a much shorter wavelength) can.

Types
There are three types of microwave ovens- convection, grill, and solo.

Convection- A convection microwave oven is a combination of a standard microwave and a convection oven. It allows food to be cooked quickly, yet come out browned or crisped, as from a convection oven. Convection microwaves are more expensive than standard microwave ovens. It uses a fan and a heating element to create airflow patterns inside the microwave oven. This ensures optimum browning of the food in the fastest possible times, making it an ideal choice for baking.

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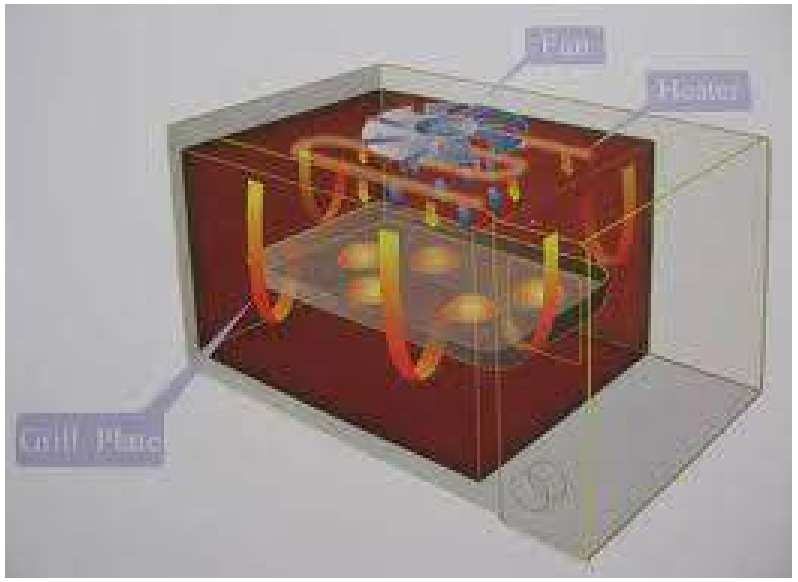
1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a, 6b, 6c, 6d, 6e
   6f. LPG Stove
   6g. Electric Stove/Hot Plate
   6h. Solar Cooker
   6i. Induction Stoves
   6j. Microwave Oven
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details



Distribution of convection currents in the microwave oven
[Image source]

Convection microwave oven.
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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a, 6b, 6c, 6d, 6e
   6f. LPG Stove
   6g. Electric Stove/Hot Plate
   6h. Solar Cooker
   6i. Induction Stoves
   6j. Microwave Oven
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Apart from this, this type of oven has several additional features which are presented below.

It cooks the food in three ways (Triple Heating System), with a performance that's 23% faster than conventional single heating systems. The ceramic heater penetrates deep, while the outside is cooked by quartz heating.

The interiors are coated with ceramic enamel which is durable, as it will not scratch like stainless steel, or crack like plastic. And it's also easy to clean with just a damp cloth to wipe away all kinds of splatters. In addition, the walls are coated with an advanced material that acts as an anti-bacterial agent and deodoriser.

Some of the convection type microwave ovens have a Steam Clean System to clean the microwave oven. The Steam Clean container is filled with water and is placed close to the wall of the microwave oven. Then Steam Clean button is pressed. After a few moments, just one wipe is all it takes to eliminate bacteria and odours. This is a hygienic cleaning system that keeps the microwave oven clean and hygienic, without using detergents.

Grill - Grill microwave ovens can be used to cook food which is crispier from outside and juicer from inside making it an ideal choice for succulent Kebabs and Tikkas.

Grill type microwave oven
[Image source]

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a, 6b, 6c, 6d, 6e
   6f. LPG Stove
   6g. Electric Stove/Hot Plate
   6h. Solar Cooker
   6i. Induction Stoves
   6j. Microwave Oven
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

They too have a unique three way cooking system that is perfect if one wants to cook food that is crispier from the outside and juicier on the inside. They use the long wavelength system for cooking which allows heat to penetrate deep inside the food thus cooking the food well inside as well as outside. They help to achieve good browning and grilling for kebabs and tikkas like in the conventional ways of preparing these Indian items.

A conventional wave distribution system distributes microwaves from a single aperture antenna. This antenna has a high efficiency but low distribution capacity. In this case, microwaves are concentrated to a particular section of the food. To overcome this problem of uneven distribution of heating TDS (Triple distribution system) cooks every part of the food evenly with an aperture antenna as well as 2 additional slot antennas ensuring wide distribution of waves.

Solo - Solo microwave oven is the choice for an all round cooking solution. With uniform heat distribution, multiple power levels and a host of other features, Solo is ideal for everyday tasks like defrosting, reheating and cooking.

This type also has TDS (Triple distribution system) which cooks every part of the food evenly with an aperture antenna as well as two additional slot antennas ensuring wide distribution of microwaves.

Solo type microwave oven
[Image source]

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
   6a, 6b, 6c, 6d, 6e
   6f. LPG Stove
   6g. Electric Stove/Hot Plate
   6h. Solar Cooker
   6i. Induction Stoves
   6j. Microwave Oven
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Uses

Microwave ovens are generally used for time efficiency, in both commercial applications, such as restaurants, in the office and at home, rather than for cooking quality, although some modern recipes using microwave ovens are better than the recipes using traditional ovens and stoves. Professional chefs generally find microwave ovens to be of limited usefulness because browning, caramelization, and other flavour-enhancing reactions cannot occur due to the temperature range.

On the other hand, people who want to cook fast, use microwave ovens to prepare food or to reheat frozen/stored food in only a few minutes. Microwave ovens can also be used to defrost items that will later be cooked by traditional methods, reducing the time it takes to defrost foods naturally. Microwave ovens are also useful for the ease with which they can perform some traditionally cumbersome kitchen tasks, such as softening butter or melting chocolate, warming milk to set curds, heating garlic pods so they can be peeled easily etc.

Unique Features

Some of the modern Indian microwave ovens have the following features too:

Multistage Cooking: The microwave oven has grill, thaw and bake options like- thaw + bake + grill, microwave + convection + grill, etc for different types of food items.

Speed Defrost: This feature thaws food in minutes in the microwave oven.

Child Lock: Protects children from accidental shocks and other harm.

Auto Menus: Indian and continental food can be cooked with absolute ease. Special baking programmes exist to bake delicious cakes and cookies too.

Glassware is preferred to plastic ware for use in a microwave oven unless specially designed plastic containers and food wraps (which can withstand microwave radiation) are used. Some products may use the term "microwave safe", may carry a microwave symbol (three lines of waves, one above the other) or simply provide instructions for proper microwave use.

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   - 7a. Mortar and Pestle
   - 7b. Mixer or Grinder
   - 7c. Coffee Filter
   - 7d. Wet Grinder
   - 7e. Roti maker - Roti press
   - 7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Kitchen Helpers

There are a number of kitchen helpers used in Indian kitchens from the very beginning. These items help in the preparation of the ingredients before the actual cooking process begins. Cutting, chopping, grinding, extruding, squeezing, and stirring are some of the many processes that are required for preparing different food items in Indian cuisine. Since their functions are unique, there are no substitutes to these helpers. Through time they have become refined in their forms and their functions. There also have been changes in the materials used, and the manufacturing processes adopted over the times. These items also lend a unique identity and flavour to whatever they help prepare.

Mortar and pestle

Mixer or grinder

Coffee filter

Wetgrinder

Roti maker - Roti press

Chakli Press or Murukku

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   - 7a. Mortar and Pestle
   - 7b. Mixer or Grinder
   - 7c. Coffee Filter
   - 7d. Wet Grinder
   - 7e. Roti maker - Roti press
   - 7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Coconut scraper

Lemon squeezer

Kova moulds

Chopping board

Whipper, Whisk beater

Buttermilk churner

Sieve

Knives, peelers, Graters

Winnow

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Mortar and Pestle

A mortar and pestle is a tool used to crush, grind, and mix solid substances. The mortar is a bowl-like vessel used to contain the substance to be ground. Mortars have smooth, rounded bottoms and wide mouths. The pestle is the pounding and grinding instrument.

The English mortar derives from classical Latin mortarium, meaning, among several other usages, receptacle for pounding and product of grinding or pounding. The classical Latin pestillum led to the English pestle, meaning pounder. The antiquity of these tools is well documented in early literature, such as the Egyptian Ebers Papyrus of 1550 BCE (the oldest preserved piece of medical literature) and the Old Testament. Mortars and pestles were traditionally used in pharmacies to crush various ingredients prior to preparing an extemporaneous prescription.

For pharmaceutical use, the mortar and the head of the pestle are usually made of porcelain, while the handle of the pestle is made of wood.

Marble Mortar and Pestle

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

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Kitchen Products

The Sanctum Sanctorum of the Indian household

by
Madhuri Menon
IDC, IIT Bombay

Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/mortar-and-pestle

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Mortar and Pestle - The Kitchen Tool

Mortars and Pestles are tools that have been used in cooking for thousands of years.
Mortars are also used in cooking to grind spices into powder. This kitchen helper is indispensable to grind herbs like cilantro, mint, basil, pills, crack nuts, make curry pastes from scratch, grind ginger, garlic, lemongrass, and galangal. This simple but useful tool is also used to grind roast spices like green cardamom, black cardamom, cinnamon, cloves, roasted coriander, fennel seeds etc. To grind spices, one should normally apply a decent amount of force in a way that causes the spices to get dragged under the sideways-moving pestle.,

Mortars have been used widely in Aztec, Mayan and Native American cultures several thousands of years back as an aid to their cooking. It likely evolved from the more primitive grinding slab. In Japan, very large ceramic mortars called Suribachi are used with wooden mallets to prepare a dish called mochi. The mortar and pestle, called the jom and modaqqa in Lebanese, is used by Middle Eastern cooks to prepare hummus, made from cooked chickpeas and sesame seeds. In Thai cuisine, the mortar is used to crush dry chillies, a key ingredient in popular national dishes. The Mexican mortar called molcajete, made of rough-textured basalt, also is used to crush both dried and fresh chillies for salsas and moles, the complex sauces that are a hallmark of the country's cuisine.

Granite mortars and pestles are used in Southeast Asia, as well as Pakistan and India.
In India, it's used extensively to make spice mixtures for various delicacies as well as day to day dishes. Indian cuisine celebrates spices, and these enhance curries, stews and sauces. The key to extracting the essence of the spice is to lightly toast the whole spice, then grind in a mortar. Grinding fresh spices for each recipe, rather than buying ground spices and storing them, adds pure flavour to a dish. The mortar is preferred over a modern food processor since it gives the dish some coarsely ground texture, not the paste-like consistency created by the food processors.

Also in various traditional Hindu ceremonies (such as weddings, and Upanayanam or thread ceremonies) the mortar and pestle are used to crush turmeric. However, with the advent of motorized grinders or food processors , the use of the mortar and pestle has decreased in India.

Types of Mortars

Mortars and pestles come in a variety of designs and materials, often utilizing local materials or designed to perform a specific task in a culinary tradition. Good pestle and mortar-making materials must be hard enough to crush the substance rather than be worn away by it. They cannot be too brittle either, or they will break during the pounding and grinding. The material should also be cohesive, so that small bits of the mortar or pestle do not get mixed in with the ingredients. Mortars and pestles are generally made out of stone, hard wood, stainless steel, marble or clay. Small wooden ones are fairly cheap, but a really good, stone or stainless steel mortar and pestle are on the expensive side.

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Rough ceramic mortar and pestle sets can be used to reduce substances to very fine powders, but stain easily and are brittle. Porcelain mortars are sometimes conditioned for use by grinding some sand to give them a rougher surface which helps to reduce the particle size. Glass mortars and pestles are fragile, but stain-resistant and suitable for use with liquids. However, they do not grind as finely as the ceramic type. Marble and porcelain mortars do not retain flavour. Wooden mortars wear down and must be carefully cleaned, but can attain a wonderful patina over the years.

The size and use also play an important role in choosing a small or a large mortar and pestle.
Also the porosity of the mortar is important. Smooth and non-porous materials are chosen that will not absorb or trap the substances being ground. Those made from a non -porous material like granite, are best - as a rough or absorbent material may cause the strong flavour of a past ingredient mingling with current ones, thus entirely changing the taste.

How to clean a Mortar
The food particles left in the mortar and on the pestle may support the growth of microorganisms so regular cleaning is essential.

• Wipe the mortar and pestle clean with a cloth or paper towel, then wash in warm water with a little soap.

• Rinse several times, then dry with a towel and place upside to drain any water that may be trapped in uneven surfaces like granite or lava stone.

• To remove any residual flavour grind uncooked white rice or coarse salt and dried bread in the mortar.

• A thin coating of mineral oil, which will not go rancid, can be applied to wooden mortars.

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Mixer or Grinder

A mixer is a kitchen appliance used for mixing, folding, beating, and whipping food ingredients. Mixers come in two major variations, hand mixers and stand mixers.

Hand Mixer
This is usually available as a manually-operated type. Hand mixers preceded electric mixers and are still used to-day. A hand mixer consists of a handle with a hand-operated crank on the side, geared to two beaters. The handle is held with one hand and the crank is turned with the other, turning the beaters which act on the food ingredi-ents.

The electrically powered type is a present day innovation of the same hand mixer concept. This eliminates the use of manual work and makes it very easy to operate and in a much lesser time too. It consists of a handle mounted over a large enclosure containing the motor, which drives one or two beaters by the mere pressing of a button. The beaters are immersed in the food to be mixed. Various attachments – each shaped differently are provided with a hand mixer to perform the mixing, folding, beating and whipping operations specifically.

Handheld electric mixer with various attachments

Design Resource

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Design Resource

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Stand Mixer :
A stand mixer is essentially same as a hand mixer, but is mounted on a stand which bears the weight of the device. Stand mixers are larger and have more powerful motors than the hand-held ones. They usually have a special bowl that is locked in place while the mixer is operating.

Stand Mixer [Image source]

Mixers are very different from blenders. Blenders contain sharp blades and operate at higher speeds compared to mixers and are used more to chop, liquefy, or break down larger food items. A mixer is a much slower device without sharpened blades.

Grinders / Food Processors
A food processor is a kitchen appliance used to facilitate various repetitive tasks in the process of preparation of food. The term almost always refers to an electric-motor-driven appliance in the present day.

The idea of a machine to process food began when a French catering company salesman, Pierre Verdun, observed the large amount of time his clients spent in the kitchen chopping, shredding and mixing. He produced a simple but effective solution, a bowl with a revolving blade in the base. In 1960, this evolved into Robot-Coupe, a company established to manufacture the first commercial "food processor" for the catering industry. Further trials by various people at different times across the world helped evolve the present day grinder/ food processor.

Design Resource

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/mixer-or-grinder

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Fuctions

Food processors normally have multiple functions, depending on the placement and type of attachment or blade. These functions normally consist of:

- Slicing/chopping vegetables
- Grinding items such as nuts, coconut kernel, seeds (e.g. spices), meat, etc
- Shredding or grating cheese or vegetables
- Pureeing
- Mixing and kneading dough

Design and Operation

The base of the unit houses a motor which turns a vertical shaft. A bowl, usually made of transparent plastic, fits around the shaft. Cutting blades can be attached to the shaft; these fit so as to operate near the bottom of the bowl. Shredding or slicing discs can be attached instead; these spin near the top of the bowl. A lid with a "feed tube" is then fitted onto the bowl.

The feed tube allows ingredients to be added while chopping, grinding or pureeing. It also serves as a chute through which items are introduced to shredding or slicing disks. A "pusher" is provided, sized to slide through the feed tube, protecting fingers.

Almost all modern food processors have safety devices which prevent the motor from operating if the bowl isn't properly affixed to the base or if the lid isn't properly affixed to the bowl. These are available as both manually operated models and electrically operated ones.

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

A crank-operated food processor
[Image source]

Food processors in India

If one takes a look into the Indian Kitchen, one can see the changes that have come in, especially in the ways of cooking. The difference between a traditional and modern kitchen seems quite a bit, as earlier there were very few kitchen aids available and every homemaker had to perform most of the cooking tasks on their own.

Sil Batta

Every Indian kitchen had the stone-grinder popularly known as Sil Batta about a few decades ago. The sil is a flat stone and the batta is a smaller cylindrical stone, a little like a rolling pin, which is rolled and pressed over the spices to grind and combine them. Spices are a core ingredient in Indian cooking and the ritual of preparing and grinding the spices took place every day, fresh for each meal using a Sil Batta.

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Stone grinder or Sil Batta
[Image source]

Sil Batta in use
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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/mixer-or-grinder

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

The Sil Batta holds its own significance, one it is a good form of vigorous exercise for the arms, and the diehard believers feel that the authentic taste that it imparts to the freshly ground spices cannot be imitated by any other kitchen aid.

But it has slowly been replaced with the electric grinder/mixer for the convenience and time saving capabilities for working women.

Though unique, Sil Batta has its own identity. Though it may have disappeared from an urban kitchen it still is the main equipment used for grinding spices in a rural or a low income home.

Food Processors:
The food processor is a modern kitchen accessory without which it becomes hard for a home maker to perform the cooking tasks. It is also known as a mixer or grinder in India.

There are many well known brands in the Indian mixer/grinder market, like - Philips, Kenstar, Jaipan, Inalsa, Sumeet, Bajaj, Meenumix, Butterfly etc. All of them over the years have made commendable additions and improvements to their mixers and grinders. The latest mixers and grinders not only are efficient in grinding the food items but are also used as juicers in kitchens hence "Food Processor" is the present avatar of an all-in-one mixer+ grinder+ juicer. The Indian consumer is very happy to have acquired a single device for doing all the cum-

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https://dsource.in/resource/kitchen-products/kitchen-helpers/mixer-or-grinder

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

bersome kitchen jobs (especially suited for the Indian style of cooking) rather than having two or three different equipment to help in the kitchen.

With these latest food processors the task of chopping raw vegetables, preparing dough and getting evenly mixed vegetable mixture has become a task of seconds.

Food processors now come with a slew of latest functions like assorted multi functional blades discs and jars, multi speed levels, unbreakable attachments, and finish all the pre-cooking tasks to perfection in seconds. With the synergy of modern compact looks, powerful performance and multi utility functions, food processors or juicers+mixers+ grinders save space, time and effort.

Design

The food processors are incorporated with many innovative and advanced technological features that ease the process of cooking for a home maker, making it easier and pleasurable. This is a small unit which will take up very little space in the kitchen in comparison to the amount of work it does.

It comes with different jars, discs and blades for different purposes. The jars are made up of Polycarbonate and Stainless Steel. The jar handles are made of ABS. The blades are made of hardened stainless steel. This gives them a rust free longer life.

Key Features

Food Processor is a device that helps a lot while doing kitchen work. It cuts short the time one spends in the kitchen by about half. The processor comes with different kinds of blades like Dry Grinding blade, Wet Grinding blade, Chutney blade, Whipping blade and Mincing or Grating blade, Kneader blade, Universal blade (It is a blade which does all kinds of grinding, blending and mixing) etc, all with different usage.

The food processor consumes around 600 watts of power, which is very economical on the energy consumption. It does not increase domestic electricity bills. The device works with the power supply of 230V single phase.

Some food processors have a 90 degree 3 speed ergonomic switch with incher facility which is a very useful feature.

Sometimes an 'over load protection' switch for the motor which protects the food processor is present in some models.

Some of them have a cord winding facility for easy storage of the electric cord.

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Food processors come with a maximum of 7 accessories to perform 25 functions. They are: a stainless steel blade for chopping, beating, creaming, crumbling, cutting, folding in, mashing, mincing, mixing; a kneading tool for (heavy) kneading; a slicing insert for medium slicing of vegetables and fruit either coarse or fine; a shredding insert for medium shredding of vegetables, fruit and cheese either coarse or fine; an emulsifying disc for whipping, whisking, emulsifying; a granulating insert for granulating potatoes; and a blender for blending, crushing, foaming, grinding, (heavy) pureeing, homogenising, liquidising, milling, shaking, stirring.

Accessories
Usually, different jars are provided with a food processor to carry out various functions. These jars are the Liquidizer or Blender Jar (1 litre capacity usually), Chutney Jar (0.4 litre capacity usually) and Grinding Jar for both wet and dry grinding (1 litre capacity usually).

With the liquidizer jar one can prepare milkshakes, and purees within seconds. With the chutney jar one can make different kinds of chutneys quite fast. The grinding jar is for different kinds of grinding. The juicer has the following attachments- Bowl, Pulp Container and Food Pusher.

Some extra attachments that are provided by some manufacturers are: Processing blade holder, Safety cover, Centrifugal juicer attachment, Citrus juicer attachment, Spatula etc.

Some Indian brands of food processors which have evolved into modern products:

Inalsa food processor
[Image source]

Phillips food processor
[Image source]

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Blenders
A blender or liquidiser is a kitchen appliance used to mix ingredients or puree food.
Blenders are different from lower-speed hand-powered or electric mixers that are used for mixing applications. The term typically refers to a stationary, upright electrical device, but hand-held immersion blenders have become common in recent years.

The hand-held immersion blender has no container of its own, but instead has a mixing head with rotating blades that can be immersed in a container.

Food processors are similar to blenders in many ways. The primary difference is that food processors use interchangeable blades and disks (attachments) instead of fixed blades. Also, their bowls are wider and shorter, a more appropriate shape for the solid or semi-solid foods usually worked in a food processor. Usually little or no liquid is required in the operation of the food processor unlike a blender, which requires some amount of liquid to move the particles around its blade.

Blenders also have a variety of applications in microbiology and food science. In addition to standard food-type blenders, there is a variety of other configurations of blenders for laboratories.

Hand-held Blender:
An immersion blender, or 'stick blender' is a kitchen appliance to blend ingredients or puree food in the container in which they are being prepared. They are sometimes called stick blenders, wand blenders, and hand blenders. They may be used for pureeing soups and emulsifying sauces. Some can be used while a pan is on the stove. Immersion blenders are distinguished from blenders and food processors that require food be placed in a special vessel for processing. They are distinguished from hand mixers which do not chop the food as it is blended.

The immersion blender was invented in Switzerland by Roger Perrinjaquet, who patented the idea on March 6, 1950. He called the new appliance "bamix", a portmanteau of the French "bat et mixe" (beats and mixes). The immersion blender has been in use in European professional kitchens since the 1960s, and was adopted for home use in the United States market in the 1980s.

Development
The Polish-American Stephen J. Poplawski, an owner of the Stevens Electric Company, began designing drink mixers in 1919 under contract with Arnold Electric Company and patented the drink mixer in 1922 which had been designed to make Horlicks malted milk shakes at soda fountains. He also introduced the liquefier blender in 1922. Since then numerous models have been designed and several modifications have been made to arrive at the popular present day versions that are available now.
With the rising popularity of smoothies, Frappucinos and other frozen drinks prepared in front of the customer,

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

new models of commercial blenders often include a sound-reducing enclosures and computerized controls.

Indian Brands

Some Indian brands of handheld blenders are shown below. These have been designed taking into consideration the requirements of the Indian style of cooking.

Phillips hand held blender
[Image source]

Phillips food processor
[Image source]

There are a number of attachments available with the hand blenders depending upon different uses and prices. Cooking gets so easy with the hand blenders, it does not occupy much of space and the wall holder allows it to be positioned against a wall easily.
Some special features of some popular Indian blender brands are

- 600 watts/400 watts DC motor
- 2 Speed Soft Push Button
- Variable Speed Control
- Easy Locking System
- Comes with beaker, chopper and whisker attachment
- Slim ergonomic design
- Rubber mat provided for chopper and beaker

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

- Universal blade for multiple functions
- Detachable stainless steel leg for easy cleaning
- Comfortable grip for ease of use
- Wall mountable

Design

The basic handheld food processor has a sleek white body that houses the motor. The unit has a stainless steel leg with 4 detachable attachment blades. The Beaker Accessory acts as a blender jar and also works as a measuring cup. As an innovation it also has a chutney attachment to give one a complete package. The twin speed on/off switch must be pressed while using the appliance. This lightweight hand blender gives a good grip to one's hands. It takes no counter space as it comes with a wall-bracket.
Models for home use usually have a shaft of ten to twelve inches, but models are available for professionals with a shaft up to two feet. Home models are available in corded or cordless versions.

Key Features

The wide variety of blade attachments makes the blender perfect equipment for an Indian kitchen. With 160 watts of power and a speed range of 12000 r. p.m, all the tasks are performed efficiently. The four different blades handle blending, whisking, chopping, mincing and slicing seamlessly. The beaker can be used for soups, shakes and juices. The chutney jar can be used also for chopping and mincing.

Pros

The hand blender is equipped with a unique fruit filter accessory that will filter skins, pulps and seeds from your freshly made juices. With such great, easy- to- clean, easy to use features, it proves to be a good cocktail assistant.

Cons

The power input is low for such multi-functions.

With versatile attachments, easy-to-use features the blender is a preferred choice in some households to the food processor. As the hand blender is clutter free and has easy maintenance, one can save a good amount of money and energy by investing on it.

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https://dsource.in/resource/kitchen-products/kitchen-helpers/mixer-or-grinder

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Applications:
Blenders are used both in home and commercial kitchens for various purposes, such as:

- Making soups, juices, whipping creams, churning butter, chopping onions, garlic, grinding onions, for the Indian way of cooking
- Mix and crush ice in cocktails such as the Piña Colada and frozen margaritas
- Crush ice and other ingredients in non-alcoholic drinks such as Frappucinos and smoothies
- Make smooth purées of semi-solid ingredients, such as cooked vegetables and meat
- Reduce small solids such as spices and seeds to powder
- Blend mixtures of powders, granules, and/or liquids thoroughly
- Help dissolve solids into liquids

Design Resource

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   - 7a. Mortar and Pestle
   - 7b. Mixer or Grinder
   - 7c. Coffee Filter
   - 7d. Wet Grinder
   - 7e. Roti maker - Roti press
   - 7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Coffee Filter

The Madras filter coffee is nearly an institution - one that most South Indians cannot do without. The wafting aroma of freshly brewed filter coffee heralds the new day in most South Indian homes. The coffee filter can be found in the most South Indian kitchens, occupying a place of pride. This creates a thick coffee decoction, which when mixed with the right amount of hot milk and sugar produces the divine taste! South Indian Coffee, also known as 'Filter kapi' is a sweet milky coffee made from dark roasted coffee beans (70%-80%) and chicory(20%-30%), especially popular in the southern states of Andhra Pradesh, Karnataka, Kerala and Tamil Nadu. The most commonly used coffee beans are Arabica and Robusta grown in the hills of Karnataka (Kodagu, Chikkamagaluru and Hassan), Kerala (Malabar region) and Tamil Nadu (Nilgiris District, Yercaud and Kodaikanal). Traditionally, the coffee bean varieties Plantation A or Pea berry are used to make Filter Coffee, with Plantation A being considered slightly inferior.
The secret to creating the decoction of the right consistency lays in the quality of the ground filter coffee powder as well as the boiling hot water that is added to it. Boiling hot water allows the rich flavor of the coffee powder to be released into a thick decoction.

The picture shows what a south Indian coffee filter typically looks like. A lower chamber that catches the filtered coffee, the upper chamber where the coffee powder/ grounds are spooned into and boiling water is poured, the plunger which is put into the upper portion after the coffee but before the water is poured in, and the lid.

The filter has an upper chamber with a perforated bottom. The coffee powder is put in this, covered with the plunger and enough boiling water is poured in the upper chamber and then closed with the lid. The coffee decoction drips and collects in the lower chamber. This takes a little time (about an hour). This is the first decoction and very thick and strong. Some more boiling water is usually poured into the upper chamber a second time and collected separately and used while making the coffee.

Usually the coffee filter is set up, with coffee powder and boiling water, last thing at night, so the decoction is ready for coffee in the morning. The extra decoction can be refrigerated for the day.

There are a couple of precautions to take while making filter coffee or else the quality and taste of the coffee suffer.

- Never heat the decoction or the coffee once the decoction has been added to the milk. If you must, then place the decoction or prepared coffee in a hot water bath and warm it.
- It helps to add the decoction to the milk and not vice versa. This also helps to judge how much decoction is required.

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Stainless steel coffee filter

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

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Source:
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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Design Resource

Kitchen Products

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/coffee-filter

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Aluminium coffee filter

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Source:
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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/coffee-filter

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Making of Coffee
For the decoction:
• 3 - 4 heaped tbsps coffee powder (this also depends on the brand of coffee used)
• Boiling water

Make sure the coffee filter is clean and dry. Spoon in the coffee powder. Tap slightly to allow the powder to settle but do not pack it down. Cover with plunger. Pour the boiling water till the upper chamber is full. Close with lid and allow the coffee to percolate.

Ingredients (for 1 cup):
• 2/3 cup boiled, hot milk
• About 2 -3 tbsp first expressed strong coffee decoction
• A little less than ¼ cup second expressed decoction to make up the cup of coffee
• Sugar to taste

Process
Pour the milk into a pan. Add the sugar and both decoctions. Stir and pour into another small pan. To make the coffee froth, pour it back and forth into a glass. Now pour this into the steel tumbler and place it in the Davara. The coffee is ready to be served and savoured! The Davara, Dabarah - "Dabarah" (also pronounced in some regions of South India as Davara) a small vessel with lipped walls and tumbler (glass) sets are made out of stainless steel. These are what are used to serve coffee traditionally.

Coffee is typically served after pouring back and forth between the Dabarah and the tumbler in huge arc-like motions of the hand which produces delicious froth on the top. This serves several purposes: mixing the ingredients (including sugar) thoroughly; cooling the hot coffee down to a sipping temperature. The distance between the pouring and receiving cup leads to the coffee's other name "Meter Coffee".It is called Meter-Kaapi in some Udupi hotels as the coffee is poured into the tumbler from a meter's height to produce maximum froth.

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

If the coffee is too hot to drink, then about half the coffee is poured into the Davara and allowed to cool till the required temperature. It is also known as "one by two" kapi as it can be shared by two people; one uses the Davara and the second person the tumbler to share the quantity of coffee.

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Wet Grinder

This amazing machine is a perfect kitchen accessory that helps to prepare the batter for making Idlis, Dosas, Vadas, Dhoklas, etc. A lot of people use a mixer/grinder for the same purpose. But the advantage of using a wet grinder is that the heating or overheating that occurs during the mixer/blender operation tends to heat up the ingredients and sometimes imparts a slightly different taste to the batter unlike the wet grinder that does stone grinding. Hence in a way the grinding in a wet grinder preserves the micronutrients of the batter.

Manual Stone Grinders:
This machine has drastically reduced the hard work that had to be done in the earlier days by women using a manual stone grinding apparatus. This required a lot of energy, stamina and time, as small quantities of the ingredients used to be ground.

Since these grinders were made of large stones they were always placed on the ground either in a kitchen corner or in a kitchen yard. The grinding was achieved by using a cylindrical stone with either a wooden handle at the top or a slightly tapered top portion. This was rotated by hand by a person in a squatting position in a circular motion inside a slightly deep hole present in the centre of a solid stone base, shaped like a large bowl but having a flat surface on the top with a raised rim all along the outer diameter. Small quantities of water had to be added from time to time to reduce the friction and aid smoother grinding. Traditionalists believe that the quality of batter and hence the taste, and quality of the Idlis, Dosas, etc. that were made with this kind of grinding was far superior to any other kind.

Manual stone grinders
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Source:
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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Different types of Wet Grinders
The mechanised wet grinders are available in two types–table top type, and tilting type.

Table top type wet grinder:

[Image source]

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Source:
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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Features of Table Top Wet Grinders

These grinders are portable and designed to be mounted on a table top. They are designed to provide continuous and trouble free service and for easy cleaning and maintenance. These wet grinders are used for a wide variety of wet grinding applications, yielding a batter that forms the base for delicious preparations like idli, dosa, vada and lot more. These can be also used for pulping vegetables for soups, for grinding semisolid masalas and chutneys.

These have the highest motor rating in this class of grinders in the market. This prevents the motor from overheating even under long and heavy use. They are available in varying capacities of 1.25 ltrs to 2 ltrs for domestic use.

They are also designed to have impact resistant bodies.

The grinder stone is made of hard black, good quality, granite that ensures no chipping or powdering during wet and dry grinding applications. The plastic components used are made of food grade nylon.

The rotation of the grinder stone in this equipment is maintained at a moderate speed to avoid heating of the ground paste thereby retaining the micro-nutrients in the food. This helps in longer shelf-life of food unlike other high speed rotating appliances, where the heat generation affects the taste as well as the micro-nutrients in the food.

The roller stones crushes, mixes, pounds and grinds simultaneously, so that all the ingredients are ground to exact proportions and are thoroughly mixed, retaining the nutrition value and also the desired taste.

Tilting Type Wet Grinder:

[Image source]

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Source:
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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Features of the Tilting Type Wet Grinder

The most important feature of this type of grinder is its space saving ability. In this type of wet grinder roller stones are used for efficient and smooth grinding hence they make very less noise while operating.

Powerful and energy efficient motors are required in these types of wet grinders.

The parts which do the grinding are in a steel drum. Two roller stones are connected with each other through a plastic rod in-between and they can be removed for the purposes of cleaning. A titling feature in these types makes it unnecessary to have to lift the vessel or drum to pour out the batter. Thus cleaning is easy by simply pouring in water, running the grinder for a few seconds and pouring out the water; it almost cleans itself.

This can be used to grind coarse dry powders too, along with the usual wet grinding abilities.
Usually stainless steel is the material used for the stand as well as the grinding drum for strength and durability. The motor housing is usually made of plastic. The grinder stone is made of hard black, good quality, granite that ensures no chipping or powdering during wet and dry grinding applications. The plastic components used are made of food grade nylon.

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Roti maker - Roti press

Roti and its thinner version, known as chapati are an integral part of the Indian cuisine. The word roti is derived from the Sanskrit word (rotika), meaning "bread."

It is particularly popular in northern India, Central India and Western India. Rotis are one of the most common forms in which wheat, the staple of northern South Asia, is consumed. Chapati is a form of roti (bread). The words are often used interchangeably. While roti refers to any flat unleavened bread, chapati is a roti made of whole wheat flour and cooked on a *tawa* (flat skillet). It is normally eaten with curries or cooked vegetables.

Modern metal tawa
[Image source]

A roti, made of a dough similar to that used to make chapatis and cooked in an oven, is a 'Tandoori roti'.

Tandoor (oven) [Image source]

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/roti-maker-roti-press

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

The combination of wheat flour with one or more flours (e.g. chickpea (besan), maize, or millet) will produce a "missi roti". Rotis made with pearl millet(bajra) or maize(makka) or (jowar) flour usually carry the name of the flour, as in "bajra roti" or "makke ki roti"
Often, the top of a chapati is slathered with butter or ghee (clarified butter). A piece of chapati is torn off and used to pick up the meat or vegetable dish (es) that make the meal. It is folded into a sort of loose cone and used as a scoop to eat the more liquid dishes at a meal like dal.
Chapati sizes (diameter and thickness) vary from region to region and kitchen to kitchen. In Gujarat, for example, the chapati is called a 'rotli' and can be as thin as tissue paper. Chapatis made in domestic kitchens are usually not larger than 15–18 cm in diameter since the 'tawa' from which they are made comes in sizes that fit comfortably on a domestic stove top. Tawas were traditionally made of unglazed earthenware, but are now typically made from metal.
Some household simply use a kitchen work top as a sort of pastry board, but homes have round flat-topped 'boards' specifically for rolling out chapatis that may be made of wood or white marble. The shape of the rolling pin also varies from region to region.

Different types of Roti Makers:
Wooden board-Chakla with a rolling pin-Belan :
Chapatis are made from a firm but pliable dough made from whole grain wheat flour 'Atta' (as it is known in most of the North Indian languages) and water. Some people also add salt and/or oil to the dough. Small portions of the dough are placed on a raised round wooden board called Chakla and rolled out into round discs using a rolling pin called Belan. The rolled-out flat disc is then placed on a preheated dry tawa and cooked on both sides. In some regions it is only partly cooked on the tawa, and then put directly on a high flame, which makes it blow up like a balloon. The hot air cooks the chapati rapidly from the inside. In some parts of northern India (e.g. Punjab) and Pakistan, this is called a phulka (that which has been inflated).

Chakla and Belan [Image source]

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/roti-maker-roti-press

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Roti/Puri Press: This press is used to flatten roti/puri dough into thin, circular, pancake-like pieces, which are then fried or toasted. This is a time saving device, that makes the rolling pin obsolete.

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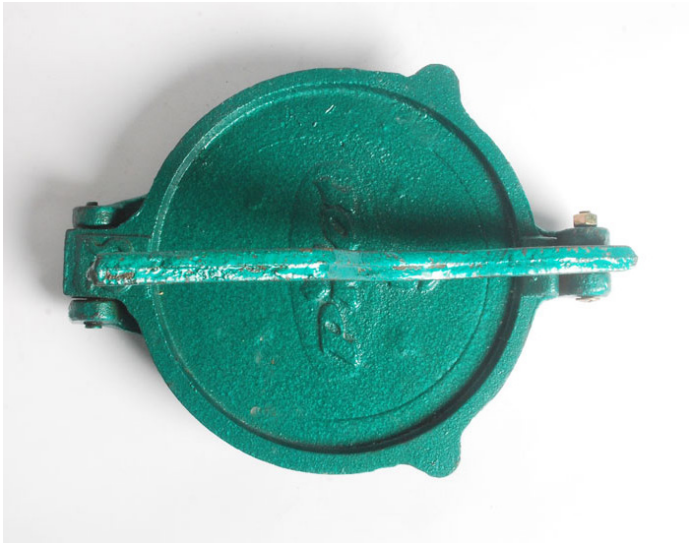

Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/roti-maker-roti-press

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Design Resource

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/roti-maker-roti-press

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Design Resource

Kitchen Products

The Sanctum Sanctorum of the Indian household

by
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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/roti-maker-roti-press

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Electric Roti Maker
This is an appliance, which reduces some of the steps from the roti making process (namely the laborious rolling the roti with a rolling pin) thus making it easier and faster to prepare a large number of rotis.

This is the electric roti/chapati maker. It cooks the roti without rolling out the dough first. This machine replaces the rolling pin and the round wooden board, the tawa and the stove. They require no oil for preparation so contribute to better health. They are economical as they save gas.

One hour of electric roti maker consumes just a little over 1 unit of electricity. It also frees up the gas stove for cooking other stuff.

Electric Roti Maker
[Image source]

Roti makers usually have a nonstick coated surface and are electrically operated. These are manufactured using food grade stainless steel which ensures their durability.

Key Features
A roti maker has heavy-weight die-cast aluminium or stainless steel top and bottom cooking plates that quickly and uniformly distribute heat so there are no hot spots to scorch rotis.

It also has a cool touch handle.

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/roti-maker-roti-press

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

The plates are coated with nonstick material for easy release and simple wipe-clean convenience.

It has a chromed steel housing.

An automatic temperature control takes the guesswork out of cooking, and a light signals, when the roti maker has been heated to the proper temperature.

Some roti makers have a heat adjustment dial for setting various temperatures.
A convenient cord storage reduces clutter, and the appliance can stand on end for space saving and easy storage.

Instruction Manual and Recipe booklet are included with most roti makers.
One Year Limited Warranty from manufacturer for any manufacturing defect too is an added advantage.

Method of Preparing the Roti/Chapathi Using an Electric Roti Maker

1. Take 2 cups wheat flour, add 1/2 tsp. salt and mix well with fingers.
2. Add a little water at a time and mix to bind the dough loosely.
3. Now use both hands and knead dough till a soft, elastic, texture is obtained.
4. For still more smoothness, grease palms with a bit of ghee.
5. Now knead dough again, lightly.
6. Cover with a moist muslin cloth and keep for 10 minutes at least before using.
7. If made many hours ahead or if extra, store in refrigerator.
8. Take care to cover well or wrap in cling film to keep the texture same.
9. This dough will make about 15 thin rotis

After 1 hour switch ON the roti maker . Before switching ON open the lid of roti maker. A red light will be come on. One can start preparing the rotis once the red light is off (this means the roti maker is sufficiently hot).It takes nearly 5-10 mins for this to happen . In the mean time the balls of dough can be prepared by smearing a drop of oil on the palms.

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https://dsource.in/resource/kitchen-products/kitchen-helpers/roti-maker-roti-press

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Now take one ball of dough , make it little flat with the palms and put it near to the lid of the roti maker. Do not put it at the center . Just as shown in the picture below for better understanding.

After 2 minutes of opening the lid, small small bubbles are formed on the top surface of the roti. Reverse the roti (use either wooden spatula or nonstick spatula , do not use steel spatulas as they would scratch the non-stick surface).

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Kitchen Products

The Sanctum Sanctorum of the Indian household

by
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IDC, IIT Bombay

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a. Mortar and Pestle
   7b. Mixer or Grinder
   7c. Coffee Filter
   7d. Wet Grinder
   7e. Roti maker - Roti press
   7f, 7g, 7h, 7i, 7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Now hold the lid down slowly and try to close the lid of the roti maker, though not completely and hold for few seconds and open again. This will give the roti sufficient heat. Rotate the roti and again close the lid like before. Open immediately after 1/2 minute. By this time a fluffy roti will be formed.

[Images source]

The roti is ready to be taken out and can be served hot. In this way 1 roti can be prepared in 1 minute.

Disadvantages of the roti maker (in terms of usage):
The roti maker has disadvantages too. One cannot eat these rotis after 2-3 hrs of making them as they turn hard which means that they must be consumed immediately when they are hot or within less than an hour of preparing the rotis. Also frozen dough cannot be used only freshly prepared dough gives fluffy rotis.

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Source:
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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e
   7f. Chakli Press or Murukku
   7g. Coconut Scraper
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Chakli Press or Murukku

Murukus originated in South Indian cooking mainly in the Tamil Nadu cuisine. They are also known as Chakli, Chakri. These are very popular in Karnataka, Tamil Nadu, Andhra Pradesh, Maharashtra, and Gujarat because of their taste and easy preparation. They are made using a Chakli press or also known as a muruku maker.

The traditional Chakli press is made of brass. It has two cylinders: one hollow with two handles at the bottom and a solid or closed cylinder with two handles at the top. The solid cylinder can slide in smoothly into the hollow cylinder. The hollow cylinder has a threaded base which accommodates different brass plates with different shapes cut out in them. The Chakli press comes with 5 to 6 plates with different designs to create different extruded shapes of the Chakli dough. The creative use of this press can generate a whole variety of different shapes of snacks.

These are now widely available in the South Indian states as a delicious crunchy snack. One advantage of these is that Chaklis/murukus can be prepared and stored in an airtight dabba or jar for long periods for consumption.

Muruku is typically made from a mixture of urad and rice flour, salt, and flavourings such as chilli, asafoetida, ajawain or cumin.

Chakli Press or Muruku maker along with different brass plates

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e
   7f. Chakli Press or Murukku
   7g. Coconut Scraper
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/chakli-press-or-murukku

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e
   7f. Chakli Press or Murukku
   7g. Coconut Scraper
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Design Resource

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e
   7f. Chakli Press or Murukku
   7g. Coconut Scraper
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Method of Making Chakli
Ingredients:
Rice flour - 5 cups
Butter- ¾ cup
Urad daal 4-5 tea spoons
Cumin seeds (Jeera) 1 tea spoon
Sesame seeds (Til) 1 tea spoon
sufficient quantities of salt, milk and oil for frying.

Process:
Roast urad daal (without oil) till they turn slightly brownish and powder them.
Add the powder, butter, cumin seeds, sesame seeds and salt to rice flour and mix well. Now add milk/water to it. Slowly mix it to remove any lumps. Make it into dough (like chapathi dough) by kneading the dough well on a flat board.

[Images source]

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e
   7f. Chakli Press or Murukku
   7g. Coconut Scraper
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Fit the Chakli press with a plate which has the required shape to help extrude the dough. Fill the Chakli press base unit with the dough and press into Chakli shape on a flat board (use a plastic paper on the board to make it easier to lift the Chaklis).

[Image source]

With the help of the top unit the dough gets pressed out or gets mechanically extruded through the hole in the bottom plate and these unique Chakli forms (a spiral or a coil) are obtained.

[Image source]

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e
   7f. Chakli Press or Murukku
   7g. Coconut Scraper
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Heat oil in a kadai and deep fry the Chaklis. Drain out on a paper napkin.

[Image source]

When the fried Chaklis are cooled to room temperature, they can be stored in any airtight container.

Murukku can also be rolled into a flat ribbon (ribbon Murukku) using a different plate which has a slit in place of hole. Sev (made using gram flour) is also obtained using this Chakli press fitted with plates which have holes of varying diameters as per the requirement.

[Image source]

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e
   7f. Chakli Press or Murukku
   7g. Coconut Scraper
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Coconut Scraper

This kitchen mate is another item that exists in the Indian and South Asian kitchens for a number of years. This is a must have in South Indian homes where the cuisine involves a lot of freshly grated coconut in almost every meal.

The core element of this humble tool is a semicircular metal plate made of mild steel or iron which has short sharp conical teeth all along its circumference. In the manual scraper this plate has a metal handle which is fixed to a rectangular wooden block. This block is fixed at approximately 45 degrees angle to a larger rectangular wooden base which helps in placing the scraper on any flat surface like the floor or a table top. People normally squat with a leg folded over the scraper's base on the floor to grip it tight to prevent sideways movement, during the process of scraping. There are also hand held scrapers where this plate is fixed to a wooden handle or embedded in a plastic moulded handle. It's only useful in scraping small quantities of the kernel at a time.

Table top coconut scraper
[Image source]

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Detail of the scraper blade
[Image source]

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e
   7f. Chakli Press or Murukku
   7g. Coconut Scraper
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Hand held stainless steel coconut scraper

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https://dsource.in/resource/kitchen-products/kitchen-helpers/coconut-scraper

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e
   7f. Chakli Press or Murukku
   7g. Coconut Scraper
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Method of Scraping:
A coconut is broken into two halves. One half is positioned in such a way that the scraping plate with the teeth is enclosed inside the coconut's hemisphere and the short sharp teeth are in contact with the tender white kernel of the coconut. The coconut hemisphere is firmly gripped with both the hands and by applying pressure it is moved in lateral directions which helps scrape out the kernel. By frequent checking and repositioning the coconut hemisphere over the scraper plate the entire kernel can be scraped into fine shreds in few minutes.

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e
   7f. Chakli Press or Murukku
   7g. Coconut Scraper
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Buttermilk Churner

Butter milk is a popular welcome drink with South Indians. During summer time big cool earthen pots containing churned buttermilk were kept in the open verandas' of homes and farmhouses and those visiting were offered a glass of cool refreshing buttermilk-the quintessential summer drink.

Buttermilk is a traditional drink that was made by churning curd with the buttermilk churner to remove the butter content. Buttermilk is also known by different names all over India- as Majjiga in Telugu, moru in Tamil, Majjige in Kannada, Chaas in Gujrati, and lassi in Punjabi. Buttermilk is taken at any time of the day specially in summer but is usually taken towards the end of a meal as it has the ability to enhance digestion. In Western countries too buttermilk is consumed as Salted Yogurt Drink, Yogurt Shake and Indian Drinking Yogurt is a blend of three tastes which are sweet, sour and astringent.

Buttermilk can be prepared very easily by blending fresh curds, plain water and salt. By replacing salt with sugar it becomes sweet lassi, very popular in North India, having its origins in Punjab.

Method of Preparation
The best way to prepare buttermilk is to always use fresh home made curds and mix it in equal parts of water to make thick buttermilk.
For a more thinner buttermilk add 3 parts of water to one part of curds and use a hand churner (traditional wooden or stainless steel churner) to churn the mixture ,rolling it back and forth between your hands.

Do this for 2 minutes. This action helps in blending the mixture well and any fat which is in the curd will separate and rise to the top. Skim off the fat.
This can be done either by a hand churner or by using a blender to blend on low speed for a minute.

Andhra Spiced Buttermilk is a soothing combination of fresh home made curds, water, fresh curry leaves, crushed ginger, green chillies, salt and a dash of lemon juice. This spice and herb infused drink is a perfect blend of myriad flavours.... sweet, spicy, sour and salty which balances and pacifies all the three doshas - Vata, Pitta and Kapha, as per Ayurveda and strengthens and increases appetite and digestive power.

Another variation is to add a tempering of mustard seeds and curry leaves to the above prepared buttermilk.

Another version is to add a dash of lemon juice to plain salted buttermilk.
North Indian version of buttermilk or lassi calls for the use of rock salt, dry roasted cumin powder and fresh mint leaves.

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/buttermilk-churner

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e
   7f. Chakli Press or Murukku
   7g. Coconut Scraper
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Each home in India has its own version of buttermilk be it North, South, East or West. The basic recipe of buttermilk is the same, only the infusion of spices and herbs differs according to each home or region.

Benefits of Buttermilk
Ayurvedic nutrition recommends buttermilk to pacify Pitta dosha (with the addition of sugar or rose water), pacify Vata and Kapha (use of rock salt, honey, spices like dry-roasted cumin powder, black pepper and herbs like ginger).Buttermilk is highly recommended as one the best home remedies for certain ailments like piles, diarrhoea, jaundice and dysfunctions of liver and spleen.

This traditional thirst-quenching refreshing drink with high therapeutic and nutritional properties is appetizing, cooling , rejuvenating, soothing and serves as an excellent antidote to sunstrokes during peak Indian summer. It goes without saying that buttermilk is the healthiest low calorie milk product among the many dairy products and works as a good calcium substitute for the high calorie dairy products.

Buttermilk serves as a good home remedy for removing sun tan. By applying buttermilk to the face and rinsing off with cool water, once dry ,regularly makes the tan disappear.

Types of Buttermilk Hand Churners
The gadget exists in various forms literally in all traditional households. They can be made out of wood, Aluminium, or Stainless Steel. Today electrical mixers have replaced this tool.

Traditional buttermilk churner in iron with a wooden handle

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https://dsource.in/resource/kitchen-products/kitchen-helpers/buttermilk-churner

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e
   7f. Chakli Press or Murukku
   7g. Coconut Scraper
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Design Resource

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/buttermilk-churner

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e
   7f. Chakli Press or Murukku
   7g. Coconut Scraper
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Modern buttermilk churner in stainless steel with a plastic handle

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/buttermilk-churner

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e
   7f. Chakli Press or Murukku
   7g. Coconut Scraper
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Traditional buttermilk hand churner

One of the finest and the simplest is this one exhibited here, that belongs to the priestly family of Chennapatna. This gadget is purely manual and very scientifically crafted by highly skilled carpenters. The high levels of precision ensure a very smooth operation. The Tamils called this 'More Mathu'. This is from a part of the personal antique collection of Mr. Steve Borgia and his family.

Antique buttermilk churning equipment
[Image source]

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e
   7f. Chakli Press or Murukku
   7g. Coconut Scraper
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Unusual Methods of Making Lassi

Washing machine maker shown in the song Mauja Mauja from the movie Jab We Met

[Image source]

Lassi being made in a washing machine???
In Ludhiana, a sadar dhaba owner uses a small top loading washing machine to make large quantities of lassi with minimum effort and in a very short time.

Hardeep Singh Sidhu, a retired maintenance engineer with Swaraj Tractors in Mohali, has been interested in how electrical gadgets are modified and used for unintended purposes. He informs that the washing machine doubling up as a lassi maker became the rage in the late eighties, especially with semi-automatic and locally produced washing machines that came quite cheap.

"People would use it for churning milk and then clean it for use in washing clothes as well," he says. For churning smaller volumes of lassi, say 5-6 litres, washing machines were too large, so someone took a table fan shaft, modified it and added blades to make a portable blender that now comes for Rs 600-700.

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https://dsource.in/resource/kitchen-products/kitchen-helpers/buttermilk-churner

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e
   7f. Chakli Press or Murukku
   7g. Coconut Scraper
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j, 7k, 7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

A washing machine converted to a lassi maker
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Source:
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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j. Sieve
   7k. Kova Moulds
   7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Lemon Squeezer

A lemon squeezer is a small kitchen aid or kitchen mate designed to extract juice from lemons or other citrus fruits such as oranges, grapefruit, or limes. The functioning of the lemon squeezer is simple - pressure is exerted on a lemon to force its juice and pulp from its rind.

It is also designed in a way that is easy to operate and to extract the juice. Lemon juice is very acidic, so the squeezer can only be made from any solid, acid-resistant material, such as plastic, glass, or metal, usually stainless steel.

History
The oldest known lemon squeezers were found in Kütahya, Turkey and date to the first quarter of the 18th century. These were individually made, and specially designed for making the then popular citrus drink sorbet. Lemons are not native to northern Turkey, though during the 17th and 18th centuries they were imported in bulk to Constantinople.

At the end of the 19th century a large number of different models of lemon squeezers were patented in the United States. The U.S. Patent and Trademark Office list over 200 patents for lemon squeezers, the majority of which were registered between 1880 and 1910 !
But over the number of years numerous lemon squeezers have been designed and manufactured and in the present day too, one has a multitude of varieties to choose from.

Varieties of Lemon Squeezer
The most commonly used lemon squeezers are the bowl shaped ones or the hand held ones. These are available in plastic glass or stainless steel. Some of these are available in round, oval, square, or hexagon shapes too.

In the bowl shaped ones there is a conical ridged centre connected to a perforated plate .This plate is seated on a collecting bowl.

By centring the halves of a lemon with their cut-side down over the ridged conical top, a user presses them and turns the lemon half back and forth to extract lemon juice. The purpose of the perforated plate is to separate the seeds, and let only the lemon juice filter down into the container.

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j. Sieve
   7k. Kova Moulds
   7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Bowl shaped lemon squeezer in plastic

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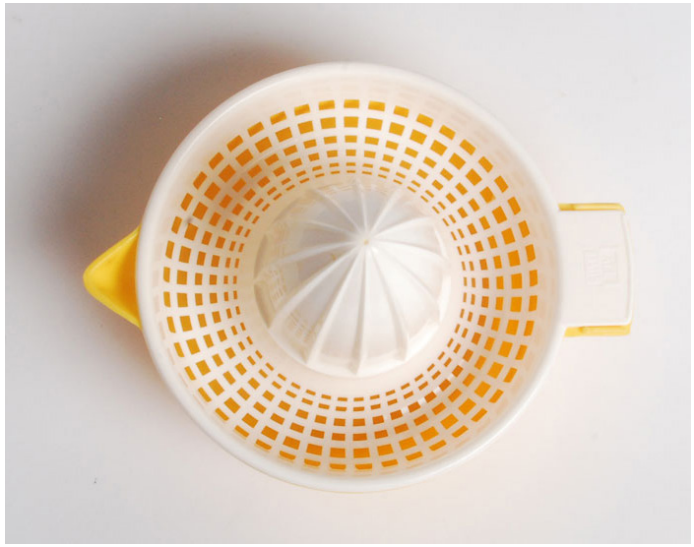

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j. Sieve
   7k. Kova Moulds
   7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

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Kitchen Products

The Sanctum Sanctorum of the Indian household

by
Madhuri Menon
IDC, IIT Bombay

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j. Sieve
   7k. Kova Moulds
   7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j. Sieve
   7k. Kova Moulds
   7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Each manufacturer produces quality, innovative designs with a fine finish. The technically designed operating mechanisms of these squeezers help in squeezing juice from lemons easily.

The hand held lemon squeezers have two handles, (one on top of the other) with two small cavities at one end of each handle. The cavity on the upper handle is smaller than the one in the lower handle. The two handles are hinged at the cavity end in such a way that the handle with smaller cavity is seated over the handle with the slightly larger cavity. The larger cavity has perforations in it which allow only the lemon juice to flow down and not the seeds.
A lemon half is placed inside the cavity of the lower handle and the upper handle is pressed down. When both the handles are pressed together the juice from the lemon half flows out.
All of them are specially designed to avoid squeezing bitter juice of the lemon seeds.

They are usually made out plastic ,stainless steel and aluminium. The ones made of stainless steel are known for their sturdiness and durability. They have distinctive features such as being long lasting, rust proof and easy to clean.

Hand held lemon squeezer in stainless steel

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j. Sieve
   7k. Kova Moulds
   7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Design Resource

Kitchen Products

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/lemon-squeezer

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j. Sieve
   7k. Kova Moulds
   7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/lemon-squeezer

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j. Sieve
   7k. Kova Moulds
   7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Instructions to squeeze juice out of a lemon

Things Needed:

- Fresh lemons or limes (small)
- Hand lime squeezer
- Container for the juice
- Cutting board
- Knife

Choose a lemon that can sit easily in the concave section of the squeezer. The more fragrant and soft the lemon, the more juice it gives.

Wash the lemon thoroughly to remove any pesticides or residue that can be transferred during the squeezing process. Place the lemon on a cutting board and with a sharp knife, cut it in half.
Place the flat part of the sliced lime into the cup. The spherical part should be facing up.
Squeeze the lemon. If using a hand lemon squeezer place the squeezer over a container to catch the juice. With one hand, squeeze the two halves of the squeezer together and watch as the juice empties into the container. With this method, it is easy to squeeze many limes or lemons rapidly without wasting any juice.

A properly inserted lemon in the handheld squeezer
[Image source]

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j. Sieve
   7k. Kova Moulds
   7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Uses of Lemon Juice
Lemon juice is used in a variety of ways. It enhances the flavour of vegetable juices. It can be used to make fresh lemonade, or can be added to soda or mixed cocktails. It is also used to make, pickles, to add a tang to vegetable salads, and in a number of Indian dishes. Use of it on a regular basis adds some vitamin C to one's diet.

If the juice from a whole lemon is needed, there are a few tricks to follow to make it easier while squeezing out the juice.

Before Cutting:
Roll the lemon on the kitchen countertop before slicing to break down some of the fibres so that the juice will flow more freely when it's cut.

To make it really easy to squeeze and get the juices flowing zap the lemon in the microwave for 10 seconds.
Lemon squeezer as a decorative object !

[Image source] and information: Juicy Salif

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/lemon-squeezer

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j. Sieve
   7k. Kova Moulds
   7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Philippe Starck was commissioned by the famous Italian Kitchenware Factory Alessi in 1986 to come up with dynamic, interesting and unique designs for everyday kitchen utensils and objects. He created a lemon squeezer on stilts called the Juicy Salif. Within ten years of its creation, the alien-like three-legged tripod lemon squeezer had earned a place in the theatre of design greatness. It is manufactured by Italian kitchenware company Alessi. Its diameter is 14 cm, its height is 29 cm, and it is made from cast and polished aluminium. This is an example of a post-modernist kitchen tool and has futuristic look. Starck's Lemon Squeezer became an avant-garde status symbol.

As the founder of the company Alberto Alessi recalls "I received a napkin from Starck, on it among some incomprehensible marks (tomato sauce, in all likelihood) there were some sketches. Sketches of squid. They started on the left, and as they worked their way over to the right, they took on the unmistakable shape of what was to become the juicy salif. While eating a dish of squid and squeezing a lemon over it, Starck drew on the napkin his famous lemon squeezer."

For the tenth anniversary of its launch, 10,000 were individually numbered and gold plated. There has also been a grey/black version. Both are now collectors' items, the grey/black version particularly hard to find. The gold plated version was described as an ornament because the citric acid in a lemon discolours and erodes the gold plating. Starck is even rumoured to have said, "My juicer is not meant to squeeze lemons; it is meant to start conversations.

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j. Sieve
   7k. Kova Moulds
   7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

Sieve

Sieves/Sifters - Sieving is a simple and convenient technique of separating particles of different sizes or to separate wanted elements from unwanted material like bran or even tiny insects from the flour using a woven mesh or net.
Sometimes a muslin cloth (a thin, loosely woven cotton cloth) is used for fine straining purposes such as to drain curds, strain juices, or often is used to line a sieve.

The traditional flour sifters are round in shape, with several discs (to control the fineness of flour) that fit into a plastic or a metallic hollow cylinder whose diameter is almost the size of a Thali/plate. A small sieve used for sifting flour has very small holes which allow only very fine flour particles to pass through.

Flour sifter with sieve discs of different hole sizes.

Different sizes of sieves.

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j. Sieve
   7k. Kova Moulds
   7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

There is another hand held sieve or Chalni which is used to filter / strain, solids in the liquids. For example, to filter out tea leaves from the tea into a cup or filter tomato puree to remove seeds etc into another vessel.

These are available with a stainless steel body fitted with a stainless steel or plastic mesh with a long handle which helps in holding. Sometimes the entire product is made of plastic with a plastic mesh.

Hand held sieve (Chalni/ Charni)

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g
   7h. Buttermilk Churner
   7i. Lemon Squeezer
   7j. Sieve
   7k. Kova Moulds
   7l, 7m, 7n, 7o
8. Items Used for Storage
9. Further Links
10. Contact Details

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/kova-moulds

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

Kova Moulds

Kova is milk based sweet. It is a very popular sweet that is normally prepared during festivals like Sri Krishna Janmashtami, as an offering to the Lord.

This kova is shaped by hand or by using moulds to achieve unique shapes. Some of the moulds come as a single piece, some in two pieces. There are small handles on top of the moulds which allow holding, in case of a single mould and fixing and removing of the kova in a two piece mould. These are made out of white metal which resembles silver but doesn't get tarnished. They are easy to handle and easy to clean. Various forms are available – a bunch of bananas, maize, a vintage car, Krishna as Vatapatrasai, etc.

Kova mould in the form of Krishna (as Vatapatrasai)

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/kova-moulds

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

Kova mould in the form of a sea shell

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/kova-moulds

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

Kova mould in the form of a car

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/kova-moulds

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

Kova moulds in the form of a bunch of bananas

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/kova-moulds

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

Kova moulds in the form of a cob of corn

Process:
Once Kova is prepared, small balls are rolled by hand. The mould that is going to be used is greased with a little ghee to facilitate easy removal of the shaped kova. The kova balls are pressed into the mould like clay then removed and left to cool. On cooling they harden sufficiently to retain the shape of the mould and are visually attractive.

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

Knives, peelers and Graters

Kitchen knives are certainly among the most important tools in a kitchen. A good knife goes a long way in making the cooking process easier. Whether one is a professional cook or a home maker, knives play an invaluable role in the kitchen. It is important to choose the best kitchen knives to suit the cooking needs.

Earlier in the Indian kitchens the "sitting down" knife was the preferred option compared to a handheld knife.

Woman sitting down to cut vegetables
[Image source]

The "sitting down" knife is stationary and the vegetable/ fruit/item to be cut is moved over the curved blade. Simultaneous use of both the hands produces a very controlled cut. It is also the fastest way to grate a coconut. This is a large item that would occupy a lot of places and had to be stored rightly too in the kitchen to avoid accidents.

In the handheld knife the vegetable/ fruit/item to be cut remains stationary and the knife is moved over to create the cuts. This is a small item and can be easily stored in a kitchen.

From general-purpose knives to specialized knives - there is a wide variety of hand held kitchen knives in the market. Using the right knife for the right purpose makes the kitchen tasks much easier and enhances the cooking experience.

Before buying a kitchen knife aspects like durability, sharpness, comfort and cost need to be considered. The need for specialist chef's knives may or may not arise in a regular kitchen. Based on one's needs, a utility knife which helps in carving, slicing and peeling would suffice. Other kitchen essential knives include the peeling knife which is generally used for round vegetables; paring knife which is used for slicing and paring fruits/vegetables; a

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

chef's knife for dicing and a bread knife.

As cost is a major factor in deciding which knives to buy, an economical option would be to invest in a knife set.

Types
There are seven basic types of **kitchen knives** in a complete kitchen knife set:

Kitchen knife set [Image source]

• **Chef knife:** This type of kitchen knife has a heavy, long blade and a sharp edge. It is used for chopping, mincing, and dicing fruits and vegetables.

• **Boning knife:** This is a kitchen knife used to remove bones from the flesh of meat like poultry, fish etc. It is a shorter knife with a flexible, curved blade.

• **Bread knife:** A bread knife is a longer knife, about ten inches long, with a serrated blade. The serrated blade is good for sawing through bread crusts without dulling the blade, and cutting the bread without crushing it.

• **Paring knife:** This kind of kitchen knife has a short, sharp blade, used for peeling fruits, or making decorative garnishes out of fruits and vegetables.

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/knives-peelers-and-graters

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

• **Filet knife:** A filet knife has a flexible, curved blade, and it is used for cutting meats and fish into thin filets.

• **Utility knife:** A utility knife is somewhat smaller than a chef knife, about five to eight inches long. It is used for cutting meats and cheeses.

• **Steak knife:** This type of kitchen knife usually comes in a set. They are good for cutting tough foods into manageable bites. They have short, often serrated, blades, and are often used in table settings.

Different types of knives normally used for different purposes.
[Image source]

Materials Used

Materials that are normally used for making the blades of the kitchen knives are brass, stainless steel, carbon steel, and galvanized mild steel. Most kitchen knives are made from stainless steel. Stainless steel contains chromium, which has the benefit of making the knife blade resistant to tarnish and rust. The drawback to stainless steel is it dulls more quickly than high carbon steel. These materials provide durability, strength, finishing, and sharpness to the blades.

The handles for the knives are made of different types of materials like wood, plastic, metal etc. and can be of different shapes too.

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https://dsource.in/resource/kitchen-products/kitchen-helpers/knives-peelers-and-graters

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

Some examples of the types of knives available in the Indian market are shown below

[Image source]

These are made of stainless steel and are fitted with a moulded plastic handle riveted to the blade. The set consists of one big knife for cutting mutton, chicken etc along with other smaller knives.

Different types of knives sold as a set
[Image source]

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/knives-peelers-and-graters

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

The knife blades in this set are made from surgical stainless steel and the handle is made from plastic material and soft grip material.

Sometimes knives are available as sets of two or three along with a peeler too.

Peelers

A peeler is used to remove the outer skin or peel of vegetables like carrots, cucumbers, potatoes and fruits such as apples, pears etc.

Peelers have a metal blade made of high quality stainless steel attached to a wooden, metal or plastic handle but nowadays there are many more varieties - fruit specific and vegetable specific peelers, household peelers, commercial peelers etc.

The most common design involves a long slightly curved steel blade (with or without serrations on the outer edges) with a special detail attached to a handle made of plastic, or a combination of plastic and steel, or wood. The vegetable or fruit to be peeled is held in one hand and the peeler is used with the other hand. The peeler is held on the surface of the vegetable or fruit and pulled with a little pressure from the top to the bottom in one long stroke carefully to remove a peel. Similar strokes done around the vegetable or fruit, will completely remove the outer skin.

Small items can be held in the hand and peeled. Large items can be held on a chopping board and similar long strokes when made from left to right or top to bottom (as is convenient to the user) complete the peeling job.

Some peelers have ergonomically designed handles that are shaped to fit the natural contours of a closed palm, so that the hand is in its most natural position while gripping and using the peeler. Ergonomic handles are believed to help reduce hand and wrist strain.

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/knives-peelers-and-graters

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

Stainless steel peeler with steel and plastic handle

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Madhuri Menon
IDC, IIT Bombay

Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/knives-peelers-and-graters

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

Graters
A grater is a utensil with sharp perforations for shredding foods like vegetables or cheese.
The cheese grater was invented by Issac Hunt in the 1540s so hard cheeses could be used easily in cooking.

Graters come in several shapes- the most popular ones are the flat types or the cylindrical and box-shaped types.

A box grater is a stainless steel 4 sided kitchen utensil. Each side of the box has a different grating surface with different sizes of grating slots ranging from fine to coarse. They are used to reduce hard foods to small particles or long, thin strips.

Most graters are made of metal mostly stainless steel that has been perforated with sharp edged, small or medium-size holes or slits. Many have handles at the top made either out of plastic or stainless steel for a sure grip. Graters made of stainless steel will not rust, whereas those of tinned steel usually do.

Some graters are made like the lids of a box so that whatever food is grated is collected neatly in a container below. The grater is usually made of stainless steel and the container below is made of plastic, which is easy to use,

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

clean and store too.

Uses

Several types of graters have different sizes of grating slots, and can therefore aid in the preparation of a variety of foods. They are commonly used to grate cheese, vegetables like carrots, beetroot, and lemon or orange peel (to create zest), and can also be used to grate other soft foods.

In tropical nations, graters are also used to grate coconut.
In Jamaica, a coconut grater is used as a traditional musical instrument (along with drums, fife, and other instruments) in some traditional performances.

Different types of stainless steel graters

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

Design Resource

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   - 7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   - 7k. Kova Moulds
   - 7l. Knives, peelers and Graters
   - 7m. Chopping Board
   - 7n. Winnow
   - 7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

Design Resource

Kitchen Products

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   - 7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   - 7k. Kova Moulds
   - 7l. Knives, peelers and Graters
   - 7m. Chopping Board
   - 7n. Winnow
   - 7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

Design Resource

Kitchen Products

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

Chopping Board

Traditional Kitchen Chopper
This timeless kitchen mate- **Aadoli** or **Addoli** as called in Konkani is a traditional kitchen chopper and grater. This is widely used in Southern regions of India to prepare vegetables for cooking and is easily available in the local markets. This is available in small to large sizes and can be customised as per one's requirements too. The blade is the concentric black metal attached to the wooden plank and is extremely sharp. At the end of the blade is a round blade with a zig - zag grooves. This serves as a grater and is used to grate coconuts. One needs to sit on the wooden plank to chop and grate vegetables, coconuts etc.

Traditional kitchen chopper
[Image source]

A modern version of the same traditional design is presently available in the markets. Stainless steel and plastic are the materials used here instead of the traditional combination of wood and mild steel/ iron. Also in this modern version it is possible to fold the cutting blade back on to the base to avoid any accidents. This way it occupies less space and helps in easy storage of the chopper in the kitchen.

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Source:
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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

A modern vegetable chopper, with a rigid cutting blade.
[Image source]

2 in 1 Cut and Wash chopping board with fixed blade
This is a modified design of the traditional vegetable chopper with a pivoted two way chopping blade which eliminates the risk of the curved, exposed cutting blade. This unique design sometimes has a vegetable cleaning drain basket along with a fixed chopping blade. At one end of the board is a 360-degrees rotatable handle for easy cutting/shredding of all kinds of fruits/vegetables. The basket attached to the side is used to collect the chopped pieces. One can rinse and drain them because of the perforations present in the basket.

The chopping board is made using good quality food grade plastic and the blade is made of stainless steel.
Varieties of 2 in 1 chopping boards

[Image source]

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

Vegetable Slicers
A slicer is a very handy tool in kitchen to cut, slice and shred vegetables.

The preparation work prior to cooking becomes very easy with these slicers. They slice, dice, wedge and chop using different stainless steel serrated blades that can evenly slice a whole tomato without crushing it. The serrated blades cut through food items easily. The blades can be changed easily, so one can cut uniformly thick or thin slices of vegetables with this one device directly into a bowl.

These slicers also have a peeler attachment, a fruit huller attachment, different blade inserts for thin slices and a countertop - holder to position it on a kitchen counter. These are made using premium quality stainless steel and are stringently tested on various parameters to ensure high strength, superior finishing standards, durability, rust resistance and easy maintenance. The body or housing of these slicers is usually made of good quality food grade plastic. These tools are light in weight and designed to be easily and safely handled. Since they are made of plastic the cleaning and maintenance are usually simple to handle.

Indians have learned to adapt them well for their cutting requirements and style of cooking. Because of their consistent sizes while cutting vegetables, and also since large quantities of vegetables can be chopped faster, they are slowly replacing the traditional products that were previously used.

Shown below are some examples of multi function vegetable slicers with different attachments. These designs have evolved from some imported products.

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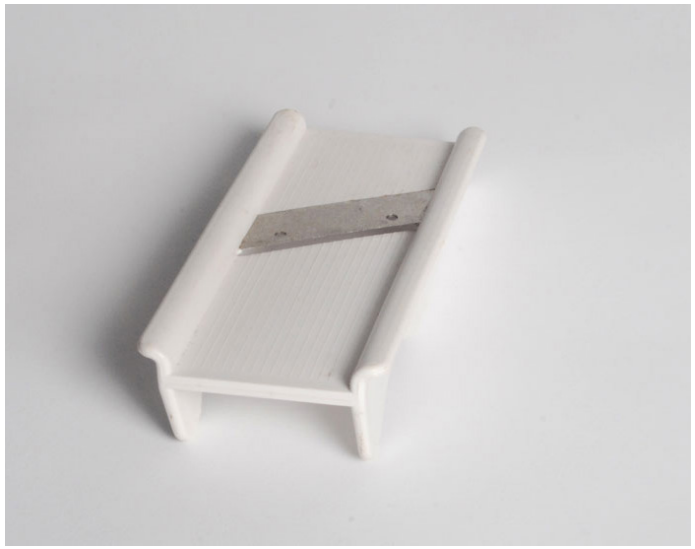
Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/chopping-board

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

A simple version of a vegetable slicer



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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/chopping-board

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

A plastic holder with thin rods acts as a prong to hold the vegetable over the slicer. By moving this over the slicer in easy, smooth movements the vegetable gets sliced as can be seen below.

[Image source]

Electrical vegetable slicer

[Image source]

This type of slicer has a plunger which pushes the vegetable on to the slicing blade hence it is much safer to use. The vegetables are put in the processing chamber and pressed down with the safety plunger and when switched on, produces perfectly cut vegetables This is an ultra-safe automatic electrical mandolin-style slicer keeps fingers safe during the vegetable cutting.

The set includes a second, hidden safety switch that activates only when the plunger is in place and has three mandolin style blades for 1.5 mm slices, 3 mm slices and julienne strips.

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/chopping-board

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

Box type vegetable slicer
Shown below is a box shaped vegetable slicer that is popular for its ultra-safe and automatic mandolin-style blades for slicing. It has a processing chamber into which all the slices or gratings will collect. It also has 3 types of mandolin style blades for producing 1.5mm thick slices, 3mm thick slices and julienne strips of vegetables or fruits. The parts are made of food grade, long lasting plastic and stainless steel for the blades.

[Image source]

Chopping Boards
A chopping board can also be called a cutting board. A kitchen would never be called as such without a chopping board. This is where one can prepare ingredients, such as spices, meat, and vegetables required for daily cooking. Kitchen cutting boards are often made of wood or plastic.

Today there are also chopping boards made of glass, steel, marble or corian, which are easier to clean than wooden or plastic ones, but tend to damage knives.

History
Women began using chopping boards centuries ago when they would chop the heads off of chicken and other birds, for cooking. They found it easier to get the knife to chop through the bone and flesh when there was a solid surface under what they were chopping. They would grab slabs of wood from the yard or elsewhere in the home to use for this purpose. Since cutting boards started out as solid wood, they continued along the same path for quite some time. The heavy wood makes an ideal surface for cutting and chopping, whether trying to cut through chicken bones or slice thin onions. The only issue with the wood is that often, chopping blocks are not treated and it is difficult to get them clean.

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/chopping-board

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

Now to purchase a new chopping board, whether in a kitchen specialty store or in an online shop, there is a huge variety of sizes, shapes and materials that the boards are made from. One can select different boards for different uses or simply have one to use for everything.

Materials

Wood

There are four common materials used in making chopping boards. Topping the list is wood. Wood usually has natural anti-septic properties, which means it can "disinfect" the chopping board immediately. It also doesn't hold on to dirt and liquid, which will not only destroy the board immediately but also contaminate the food prepared. One of the downsides of wood is that it's quite difficult to clean. Also, if it has a lot of cuts or cracks, it becomes a breeding ground for bacteria.

Hardwoods with tightly grained wood and small pores are best for wooden cutting boards. Good hardness and tight grain helps reduce scoring of the cutting surface and absorption of liquid and dirt into the surface. Teak's tight grains and natural coloration make it a highly attractive cutting board material, both for aesthetic and durability purposes. The natural oils in this tropical hardwood allow it to repel moisture, warping and microbes.

Wood boards need to be cared-for with mineral oil to avoid warping, and should not be left in puddles of liquid.

Besides hardwood, bamboo is also a well-known chopping board. Although technically a grass, laminated strips of bamboo also make an attractive and durable cutting board material. It's preferred because it doesn't allow bacteria to reproduce, and is also resilient and very durable.Wood has some advantages over plastic in that it is somewhat self healing; shallow cuts in the wood will close up on their own.

A wooden chopping board
[Image source]

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/chopping-board

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

Plastic

Plastic cutting boards are frequently used today for a variety of needs in the kitchen. Chopping vegetables on a heavy plastic surface seems to be more ideal than using a wooden board. The chopping board allows the cook to quickly and firmly chop fresh vegetables with a very sharp knife without injuring the kitchen counters tops. Plastic chopping boards can be quickly and easily cleaned and can even be put into the dishwasher when in a hurry.

While plastic is theoretically a more sanitary material than wood for cutting boards, testing has shown this may not be the case. The softer surface of plastic boards is scored by knives, and the resulting grooves and cuts in the surface harbour bacteria even after being well washed. However, unlike wood, plastic boards do allow rinsing with harsher cleaning chemicals such as bleach and other disinfectants without damage to the board or retention of the chemicals to later contaminate food.

Plastic boards are usually called PE Cutting boards, PE being a short form for polyethylene the material which the boards are made of.

A lot of design variations are available in these chopping boards. Some address the issue of flexibility, disposable options various forms, colours, sizes, etc.

Plastic chopping boards
[Image source]

Chopping board with a knife sharpener.
[Image source]

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/chopping-board

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

Unsuitable materials for a chopping board
A knife edge is a delicate structure, and can easily be blunted by too abrasive a surface. Alternately, it can be chipped if used on a surface that is too hard. A good cutting board material must be soft, easy to clean, and non-abrasive, but not fragile to the point of being destroyed.

Hard cutting boards can, however, be used for food preparation tasks that do not require a sharp knife, like cutting cheese or making sandwiches.

Glass: While glass looks like an easy surface to keep clean, glass cutting boards can damage knives because of the high hardness of the material. Cutting on glass tends to dent, roll or even chip knife edges in a rapid manner. Additionally, if used for chopping instead of slicing, glass can shatter or chip itself, contaminating food. The tops of glass cutting boards are slippery, meaning the food can slip when one cuts food on them, leading to hand injuries. Alternately, washing can be difficult because of the possibility of dropping and shattering the glass.

Steel: Steel shares the advantages of the durability and ease of cleaning with glass, as well as the tendency to damage knives. Depending on the exact steel and heat treatment used, at best a steel cutting board will wear the edge on knives quickly, at worst chip, dent, or roll it like glass.

Marble: Most marble "cutting boards" are not actually intended for cutting, but for rolling dough or use as serving boards, such as for cheese. Aside from sharing the edge damaging properties of glass and steel, marble is also subject to chemical wear, and when exposed to some food acids such as tomato juice or vinegar, will slowly dissolve.

Choosing a chopping board
There's just one thing to remember when choosing a large chopping board. It should never go beyond the size of the kitchen sink. This way, it would be easy for to clean it after use.
Decide on the purpose of the cutting board. Though these boards are generally used for, well, cutting, some of them have specific purposes. For example, those that have grooves in them are more ideal for cutting raw meat because the juices can be trapped in between these grooves.

It is safer, healthier and time saving to have separate chopping boards in a kitchen. To avoid cross-contamination, it's best to maintain at least two chopping boards - one for meat and the other for fruits and vegetables. It would also make one more productive, since one need not wash the chopping board thoroughly before cutting the rest of the ingredients but simply use the other one.

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/chopping-board

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

Cleaning the chopping Board

It is important to clean the chopping board immediately after use. Otherwise, it could allow the multiplication of bacteria and other micro-organisms that can be harmful to one's health and well-being.

The first step is to wash the cutting board with clean water and soap. One has to be careful about using cleaning solutions as some of the chopping boards don't react well to them. A very dilute bleach solution is best for disinfecting cutting boards.

One should also not allow chopping boards to remain submerged in water for a long time, especially if it's made of wood or if the water itself is dirty or looks contaminated.

To remove odours, especially in a wooden board it should be rinsed and then rubbed with coarse salt and let stand for several minutes. The board then can be wiped and then rinsed clean. This procedure will also smooth out minor imperfections in a wood board.

If the chopping board looks worn out, has a lot of dents or marks, and knives can already cut through it, this simply means that it's a better and healthier option to replace it.

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

Winnow

Wind winnowing is an agricultural method used from ancient times during the harvest time, for separating grain from chaff or husk. A winnow is also used to clean stored grains like rice, daals, etc of unwanted elements like husk, dirt, small insects/pests etc in the Indian kitchens. Some winnows smeared with turmeric and kumkum are used for certain religious ceremonies too in India.

Winnows are commonly used in rural India. In urban India metal ones are used as they are easy to clean. Winnows are used in other Asian countries too mostly in agricultural areas.
The form of the winnow is very simple. It is like a flat mat on one end which slopes down and ends, curved like a small container. The entire winnow is strengthened by thick strips of bamboo on the sides. The traditional ones are woven out of bamboo or cane strips. In the present day they are available in aluminium and stainless steel too.

Winnowing involves taking the grains to be cleaned in a winnow, holding it with both the hands and throwing the mixture into the air so that the wind blows away the lighter chaff, and the heavier grains fall back down into the container area.

A traditional form of winnow in bamboo strips
[Image source]

Winnow being used
[Image source]

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Source:
https://dsource.in/resource/kitchen-products/kitchen-helpers/whipper-or-whisk-beater

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

Whipper or Whisk beater

The whipper is a classic kitchen helper equipped with a wire dasher arranged in an elongated, springy spiral form. This is used to beat eggs to add volume to them quickly and effectively. It is also used to smoothen sauces and make them lump free by its whisking action.

Another form of the whipper has multiple wire dashers attached to a thick rubber or metal handle forming a balloon shape and is called the balloon whisk.

The wire dashers are made of stainless steel, aluminium, or plastic. The handle is made of stainless steel, aluminium or silicone for a firm grip.

A whipper needs the right amount and type of wrist action in order to work effectively and neatly. The handle of the whipper is usually held as one would hold a pencil, and the wrist is turned in a circular motion dragging the dashers on the inside bottom of the bowl containing the food mixture to be whipped. It is moved in such a way that the dashers come out of the mixture briefly and then are plunged back into the mixture repeatedly. Simple and quick, the whipper or the whisk beater is a preferred kitchen helper while dealing with eggs or sauces.

Whisk beater with a stainless steel spiral wire attached to a handle made of steel and plastic

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https://dsource.in/resource/kitchen-products/kitchen-helpers/whipper-or-whisk-beater

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
   7a, 7b, 7c, 7d, 7e, 7f, 7g, 7h, 7i, 7j
   7k. Kova Moulds
   7l. Knives, peelers and Graters
   7m. Chopping Board
   7n. Winnow
   7o. Whipper or Whisk beater
8. Items Used for Storage
9. Further Links
10. Contact Details

Design Resource

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a. Masala Dabba
   8b. Matkas Ghadas
   8c. Refrigerators
   8d. Oil Pots
   8e. Oil Dispensers
   8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

Items Used for Storage

All food items have unique storage requirements because of their different properties. Large quantities are stored differently, and the smaller quantities used for day to day usage are stored in smaller containers. The usage of different food items has to a large extent dictated the forms. With the introduction of the refrigerator in the Indian households, storage practices and items for storage have undergone a sea of change. Also the materials used and the manufacturing processes for different types of storage items has changed and evolved over the years.

Masala Dabba

Matkas Ghadas

Refrigerators

Oil Pots

Oil Dispensers

Dabbas

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IDC, IIT Bombay

Steel Tiffins

Ceramic Jars

Bharani

Source:
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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   - 8a. Masala Dabba
   - 8b. Matkas Ghadas
   - 8c. Refrigerators
   - 8d. Oil Pots
   - 8e. Oil Dispensers
   - 8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

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Source:
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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a. Masala Dabba
   8b. Matkas Ghadas
   8c. Refrigerators
   8d. Oil Pots
   8e. Oil Dispensers
   8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

Masala Dabba

A masala dabba is a traditional Indian spice box and is found in most Indian kitchens. This is used to store dry spices and is always kept near the cooking range for easy and quick access. It is also known as Anjaara Petti or masala dani.

Its design varies from being totally utilitarian to more decorative ones with clear glass lids. The outer dabba/ box may be made of stainless or food grade plastic. The masala dabba consists of a large outer container that holds seven small cylindrical bowls arranged in a tight fit. There is an outer lid that fits atop the large outer container and an inner lid that fits snugly on top of the smaller bowls. The inner lid that is kept on top of the small bowls of spices is nearly airtight and helps to keep them fresh and also to ensure that the spices do not mix. The set may also include 1 to 7 small spoons which fit neatly into the dabba.

The spices contained within the masala dabba are a matter of personal taste. Some of the most commonly used spices are red chilli powder, salt, garam masala, fenugreek, amchur (dried mango powder), mustard seeds, cumin, Bengal gram, turmeric etc.

Stainless steel masala dabba

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a. Masala Dabba
   8b. Matkas Ghadas
   8c. Refrigerators
   8d. Oil Pots
   8e. Oil Dispensers
   8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a. Masala Dabba
   8b. Matkas Ghadas
   8c. Refrigerators
   8d. Oil Pots
   8e. Oil Dispensers
   8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

Matkas Ghadas

These are vessels that are broad and round bottomed. In village homes brass pots are used for cooking and clay pots for carrying water and storing food. Many village homes have no running water or electricity. The women get water from the one or two village wells. They pour it into pots, which they carry home on their heads.

Earthen pots are used to store drinking water, a wonderful way to cool drinking water and without consuming any electricity whatsoever. Called "Matka" in Hindi and "Mann Paanai" in Tamil, earthen pots are the most effective way to cool water to just the right temperature. Unlike refrigerators which over-cool water, the pots cool them just right.The earthen pot cools water by Evaporative Cooling. The earthenware pot absorbs some of the water in it (which it will if it is not sealed with a glaze or other coating), then the outside of the pot will be slightly moistened. As this moisture on the pot evaporates, the temperature of the pot is reduced due to evaporative cooling (same way sweat cools the body). This cooling effect will keep the temperature of the pot lower than it would otherwise be. This effect will only work as long as the outside of the pot is kept moist.

Some have a tap of its own so only the required amount of water can be taken at a time.

These pots contribute to a greener India, by reducing the electricity bill.

Brass matkas

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a. Masala Dabba
   8b. Matkas Ghadas
   8c. Refrigerators
   8d. Oil Pots
   8e. Oil Dispensers
   8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

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Source:
https://dsource.in/resource/kitchen-products/items-used-storage/matkas-ghadas

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a. Masala Dabba
   8b. Matkas Ghadas
   8c. Refrigerators
   8d. Oil Pots
   8e. Oil Dispensers
   8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

Earthen pot/ matkaa

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   - 8a. Masala Dabba
   - 8b. Matkas Ghadas
   - 8c. Refrigerators
   - 8d. Oil Pots
   - 8e. Oil Dispensers
   - 8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

Types of earthen pots used for storing and dispensing drinking water

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Source:
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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   - 8a. Masala Dabba
   - 8b. Matkas Ghadas
   - 8c. Refrigerators
   - 8d. Oil Pots
   - 8e. Oil Dispensers
   - 8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

Design Resource

Kitchen Products

The Sanctum Sanctorum of the Indian household

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Source:
https://dsource.in/resource/kitchen-products/items-used-storage/matkas-ghadas

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   - 8a. Masala Dabba
   - 8b. Matkas Ghadas
   - 8c. Refrigerators
   - 8d. Oil Pots
   - 8e. Oil Dispensers
   - 8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

Design Resource

Kitchen Products

The Sanctum Sanctorum of the Indian household

by
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Source:
https://dsource.in/resource/kitchen-products/items-used-storage/matkas-ghadas

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   - 8a. Masala Dabba
   - 8b. Matkas Ghadas
   - 8c. Refrigerators
   - 8d. Oil Pots
   - 8e. Oil Dispensers
   - 8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

Design Resource

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The Sanctum Sanctorum of the Indian household

by
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Source:
https://dsource.in/resource/kitchen-products/items-used-storage/matkas-ghadas

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a. Masala Dabba
   8b. Matkas Ghadas
   8c. Refrigerators
   8d. Oil Pots
   8e. Oil Dispensers
   8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

Pots used for cooking

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a. Masala Dabba
   8b. Matkas Ghadas
   8c. Refrigerators
   8d. Oil Pots
   8e. Oil Dispensers
   8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

Design Resource

Kitchen Products

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Source:
https://dsource.in/resource/kitchen-products/items-used-storage/matkas-ghadas

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a. Masala Dabba
   8b. Matkas Ghadas
   8c. Refrigerators
   8d. Oil Pots
   8e. Oil Dispensers
   8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

On festive occasions like Pongal or Navratri pots are decorated and used for the puja celebrations. Some examples are shown below.

Decorated pot

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   - 8a. Masala Dabba
   - 8b. Matkas Ghadas
   - 8c. Refrigerators
   - 8d. Oil Pots
   - 8e. Oil Dispensers
   - 8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a. Masala Dabba
   8b. Matkas Ghadas
   8c. Refrigerators
   8d. Oil Pots
   8e. Oil Dispensers
   8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

Refrigerators

Since the beginning of civilization people have searched for ways to safely store food. All kinds of preserving processes have been used including drying, salt curing, and canning. All of these processes greatly alter the taste and nutritional value of foods hence does not fully serve the purpose of storing food.

Before the invention of the refrigerator, icehouses were used to provide cool storage for most of the year. They would be placed near freshwater lakes or packed with snow and ice during the winter, and were once very common. Natural means are still used to cool foods today. On mountainsides, runoff from melting snow is a convenient way to cool drinks, and during the winter one can keep milk fresh much longer just by keeping it outdoors.

By the mid-1800's scientists discovered that storing food at a low temperature inhibited growth of bacteria and fungus without altering the food itself too much, and the idea of the modern refrigerator was born. The refrigerator is one of the miracles of modern living that totally changed lifestyles, and leftovers could be saved for another meal without wastage!

History
The first known artificial refrigeration was demonstrated by William Cullen at the University of Glasgow in 1748. In 1834 American inventor Jacob Perkins created the cooling compression system that made in-home refrigeration possible. Unfortunately, Perkins' system used poisonous gasses to create the cooling process and many consumers died as a result of accidentally inhaling these gasses. In 1857, Australian James Harrison developed the world's first practical ice making machine and refrigeration system. Ferdinand Carré of France developed a somewhat more complex system in 1859. Unlike earlier machines, which used air as a coolant, Carré's equipment used rapidly expanding ammonia. By 1920 there were more than two hundred different models of refrigerators available.

The introduction of Freon (this is a compound which combines several nontoxic chlorofluorocarbons) in the 1920s expanded the refrigerator market during the 1930s and provided a safer, low-toxicity alternative to previously used refrigerants. Separate freezers became common during the 1940's, which was known as the "deep freeze". These devices did not go into mass production for use in the home until after World War II. In 1947 General Electric introduced the two-door refrigerator/freezer combination that is the standard design for all modern refrigerators.

The 1950s and 1960s saw technical advances like automatic defrosting and automatic ice making. More efficient refrigerators were developed in the 1970s and 1980s, even though environmental issues led to the banning of very effective (Freon) refrigerants.
In today's world the refrigerator is more environmentally friendly and uses tetrafluoroethane, or HFC as a re-

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Source:
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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a. Masala Dabba
   8b. Matkas Ghadas
   8c. Refrigerators
   8d. Oil Pots
   8e. Oil Dispensers
   8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

frigerant. Newer refrigerants are being used too; the main refrigerant now used is R-600a, or Isobutane. This refrigerant is naturally occurring and therefore has a smaller effect on the atmosphere, if released, hence more environment friendly.

With a refrigerator at home, visits to the grocer or butcher have reduced as people have started to store their requirements for a week or so. Refrigerators address very diverse demands, and are now available in hundreds of different sizes and styles, in varying prices too.

A vintage refrigerator
[Image source]

Working

The process of refrigeration requires two important factors: the fact that a gas cools as it expands and the Second Law of Thermodynamics, which states that when two objects are near each other, the warmer one cools and the cooler one warms up.

Thermodynamics: A motor and compressor are used to constrict the gas HFC, as a result this heats up. The gas is then sent through coils in the refrigerator which allow the heat of the gas to escape and the HFC to change into a liquid. The liquid travels through an expansion valve and then continues through the coils and draws heat from the compartments, then flows into a low pressure area, which allows it to boil and return to a gas.

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Source:
https://dsource.in/resource/kitchen-products/items-used-storage/refrigerators

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a. Masala Dabba
   8b. Matkas Ghadas
   8c. Refrigerators
   8d. Oil Pots
   8e. Oil Dispensers
   8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

The process then begins again and the cycle continues.
Refrigerator Parts: The refrigerator contains six important components which are vital to the completion of the process.

• **Refrigerant:**
The refrigerant, or the HFC, is the first vital component and without this gas, the process would be non-existent.

• **Evaporator:**
The evaporator is the component that absorbs heat in the refrigerator using the refrigerant.

• **Coils:**
The heat changing pipes or coils transfer the refrigerant throughout the refrigerator.

• **Compressor:**
The compressor is made of metal and is powered by a motor. It is used to increase pressure and therefore temperature for the refrigerant.

• **Condenser:**
The condenser is also very important component. It exerts pressure on the refrigerant, causing it to change into a liquid and therefore cool down.

• **Expansion valve:**
The expansion valve, which is made of thin copper wire, is used to reduce pressure on the refrigerant.

Therefore the process of refrigeration depends more on the extraction of warm air from the area surrounding an object and on evaporation than on a process that lowers the temperature of the object that is being cooled. A refrigerator is an example of a closed system, which means that nothing is gained or lost during the process of refrigeration. Instead, all gas is contained to be used by the system again.

Earlier refrigerators had latched doors. More modern units use a magnetic door gasket which holds the door sealed.

Average Food Life in Refrigerators
Proper home storage can extend the shelf life of most foods, and prevent the growth of bacteria that can cause food-borne diseases. The refrigerator should always be kept below 40 degrees (F), with the freezer set to 0 degrees (F). Individual foods have different requirements for storage, but in most cases any change in colour or texture, or an appearance of slime indicates spoilage.

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Source:
https://dsource.in/resource/kitchen-products/items-used-storage/refrigerators

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a. Masala Dabba
   8b. Matkas Ghadas
   8c. Refrigerators
   8d. Oil Pots
   8e. Oil Dispensers
   8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

Vegetables:
Fresh vegetables can be stored up to five days at 35-40 degrees (F) in moisture-proof bags. The crisper drawer is the best place for vegetables because the humidity is regulated for optimum storage. Root vegetables (onions, potatoes, etc) should be kept at in a cool, well-ventilated place at 50-60(F) degrees (not in the refrigerator). Tomatoes continue to ripen after they are picked, so they should be stored at room temperature.

Fruit:
Fresh fruit can be kept up to five days at 35-40(F) degrees, except strawberries, which are only good for three days. Citrus fruits can be stored for up to two weeks, and apples can be kept in the refrigerator for up to one month. Bananas turn brown when refrigerated, so they are best kept at room temperature.

Dairy:
Dairy Products should be stored between 34-38(F) degrees. Milk can be kept for up to eight days, and cheese can be kept until moldy. All cheese should be tightly wrapped in plastic to prevent moisture loss.

Meat/Eggs/Fish:
Meat, eggs, and fish should be stored between 33-36(F) degrees. Fresh meat should be used within three days, while cured meats can be stored for up to a week.

Poultry should also be used or frozen within 24 hours, while eggs can be stored for 3-5 weeks from the "pack date" on the carton. Always keep eggs in their original carton - this protects them from odours, breakage, and contamination by other foods.

Fish and shellfish must be used or frozen within two days. Live shellfish (clams, mussels, etc.) should be stored in an open container and covered with a damp cloth, while fish should always be tightly wrapped in plastic.

Types of Refrigerators
Domestic refrigerators and freezers for food storage are made in a range of sizes. Fridges and freezers may be free-standing, or built into a kitchen. Some models for small households fit under kitchen work surfaces. Fridges may be combined with freezers, either stacked with fridge or freezer above, below, or side by side. A fridge without a frozen food storage compartment may have a small section just to make ice cubes. Freezers may have drawers to store food in, or they may have no divisions (chest freezers).
Newer refrigerators may include:

• Automatic defrosting
• A power failure warning, alerting the user by flashing a temperature display. The maximum temperature reached during the power failure may be displayed, along with information on whether the frozen food has de-

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Source:
https://dsource.in/resource/kitchen-products/items-used-storage/refrigerators

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a. Masala Dabba
   8b. Matkas Ghadas
   8c. Refrigerators
   8d. Oil Pots
   8e. Oil Dispensers
   8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

frosted or may contain harmful bacteria
• Chilled water and ice available from an in-door station, so that the door need not be opened
• Cabinet rollers that allow the refrigerator to be easily rolled around for easier cleaning
• Adjustable shelves and trays which can be repositioned to suit the user
Some refrigerators have water chillers and water filtration systems
• A Status Indicator to notify the user when it is time to change the water filter
• A cooling zone in the refrigerator door shelves. Air from the freezer section is diverted to the refrigerator door, to cool milk or juice stored in the door shelf

There are many types of refrigerators too depending on the type of heat source they use.

Some examples are: Compressor type, absorption type, refrigerators that run on oil, gas (natural gas or propane), solar refrigerators and thermal mass refrigerators (these are designed to reduce consumption of electricity), magnetic refrigerators that work on the magnetocaloric effect, acoustic refrigerators that use resonant linear reciprocating motors/alternators to generate a sound which is then converted to heat and cold using compressed helium gas.

Refrigerators in India
Refrigerators in India are designed keeping in mind the tropical climate of India. More than 8 months of the year, 90% India faces hot humid weather. And hence, refrigerators are used in almost all households. Sale of refrigerators in India has touched new high in the recent few years as the living standards of the people have improved and refrigerator prices are now more affordable. Refrigerators for home as well as industrial use can be bought in budget starting from less than 20,000 rupees to over 1,10,000 Rupees. Refrigerators with/without freezers and separate freezers are also available with the retail stores.
A voltage stabiliser is used along with a refrigerator in most parts of India. This is to take care of the voltage fluctuations that are common in the power supplied. If these kinds of precautions are not taken the refrigerators will break down.

The types of refrigerators available in the Indian market are:

• Bottom Freezer Refrigerators
• Compact Refrigerators
• Counter Depth Refrigerators
• Freezer Less Refrigerators
• Side-By-Side Refrigerators
• Top Freezer Refrigerators
• Wine Coolers

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Source:
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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a. Masala Dabba
   8b. Matkas Ghadas
   8c. Refrigerators
   8d. Oil Pots
   8e. Oil Dispensers
   8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

Different capacities of refrigerators may range from 300 to 650 litres. One can store large amounts of food in these refrigerators.

The Indian buyers seek complete information about the refrigerators before purchasing. They prefer the best deals that give them complete value for money. Comparisons between refrigerators are made on the basis of the utility features like:

- Size and Dimensions - Small or large
- Energy Efficiency
- Capacity ranging from less than 200 litres to above 350 litres depending upon use
- Freezer capacity ranging from less than 50 litres to over 100 litres
- Defrosting system which can be automatic, semi automatic, frost free or cyclic
- The number of doors.

and additional features like:

- With water dispenser
- With Ice Maker/ dispenser
- With Door Lock
- With French Doors
- With Glass Door
- With quick freezing
- With deodorizing
- With Freezer lamp
- With humidity control.

Refrigerators in India are also given an "Energy Star" rating which indicates their energy efficiency.

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Source:
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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   - 8a. Masala Dabba
   - 8b. Matkas Ghadas
   - 8c. Refrigerators
   - 8d. Oil Pots
   - 8e. Oil Dispensers
   - 8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

Some examples are presented below:

[Image source]

This 180 litres, 1 door refrigerator shown above has a 30 litres freezer capacity has a semi automatic defrost system. It has 8 shelves and boxes, which are adjustable and has a door lock with door open alarm. It has feature of moisture and humidity control and deodoriser. It comes with Utility Drawer which is situated the bottom where one can store vegetables like potatoes and onions, which do not require refrigeration and so one can find all vegetables at one place.

[Image source]

Design Resource

Kitchen Products

The Sanctum Sanctorum of the Indian household

by
Madhuri Menon
IDC, IIT Bombay

Source:
https://dsource.in/resource/kitchen-products/items-used-storage/refrigerators

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   - 8a. Masala Dabba
   - 8b. Matkas Ghadas
   - 8c. Refrigerators
   - 8d. Oil Pots
   - 8e. Oil Dispensers
   - 8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

The above example of a refrigerator has "6th Sense Fast Forward Ice System", which gives superior cooling that helps make ice super fast. It also has roomy trays and shelves and separate section for different food items along with many features.

A small double door refrigerator
[Image source]

A triple door refrigerator
[Image source]

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a. Masala Dabba
   8b. Matkas Ghadas
   8c. Refrigerators
   8d. Oil Pots
   8e. Oil Dispensers
   8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

Multi door refrigerator with water dispenser feature
[Image source]

Refrigerators in Rural India

India hosts the world's largest population deprived of electricity. Ninety two percent of this population lives in rural India, equalling about 380 million people or 71.7 million households. The quality and quantity of power these people have access to is very poor and there is very little development happening in rural areas.

The power situation in rural India cannot be fixed overnight and until that time, products are needed to make

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a. Masala Dabba
   8b. Matkas Ghadas
   8c. Refrigerators
   8d. Oil Pots
   8e. Oil Dispensers
   8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

people's lives a little better. Effective refrigeration in rural areas can help people extend their access to not only food, but also essential drugs. The price barrier is what prevents refrigerators from becoming a household item in rural India. So a number of companies and individuals are trying to overcome these limitations and bring in solutions. It helps to come up with grass root solutions for rural products created with local ingenuity.

1. Voltas India Ltd. has launched a 65-L, direct-cool refrigerator that is specially designed to cater to rural needs - it can store heavy utensils, has tough insulation, and has built-in stabilizers to cope with high-voltage fluctuations. Also it comes at a very low price of Rs 5,000.

2. Indian conglomerate Godrej and Boyce has introduced, ChotuKool another example of a cheap refrigerator. This portable, top-opening unit weighs only 7.8kg, uses high-end insulation to stay cool for hours without power and consumes half the energy used by regular refrigerators. This is a product that has crossed several technological barriers and several social barriers as well.

The ChotuKool doesn't use a compressor, instead runs on a cooling chip and a fan similar to those used in computers, so like computers it can run on batteries. It's engineering credentials are further boosted by the fact that it has only 20 parts, as opposed to more than 200 parts in a normal refrigerator.

The ChotuKool was co-designed with village women to assure its acceptability, and is distributed by members of a micro-finance group.

ChotuKool
[Image source]

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a. Masala Dabba
   8b. Matkas Ghadas
   8c. Refrigerators
   8d. Oil Pots
   8e. Oil Dispensers
   8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

ChotuKool being taken for field testing in rural India [Image source]

3. Mansukhbhai Prajapati comes from a family of potters; he developed Mitticool another example of a rural refrigerator.His efforts were noticed by the Honey Bee network, which has done an amazing job of connecting grassroots innovators in India. Through their partner organization GIAN (Grassroots Innovation Augmentation Network) he was put in touch with designers at the National Institute of Design.

Together, they came up with the present form of Mitticool, which is a juxtaposition of the traditional and the modern. It has a clay exterior, with a plastic tap and shelves to hold the food items. The rural innovator and urban designers have come up with an object that looks like it will be very happy to be hawked at any village market, because it manages to exactly capture the tastes of today's rural Indian.

[Image source]

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a. Masala Dabba
   8b. Matkas Ghadas
   8c. Refrigerators
   8d. Oil Pots
   8e. Oil Dispensers
   8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

Mitticool refrigerator [Image source]

4. Another experiment intends to make cheap refrigerators using solar-power in India. Most commercial fridges run on diesel generators, but this new concept intends to make a refrigerator from commonly used car parts so it can be easily repaired in rural areas.

The concept was created by the Solar Turbine Group (STG), a non-profit organisation formed by students from the Massachusetts Institute of Technology. STG has already built some of its solar turbines in the African country of Lesotho, which are used for creating hot water and electricity.

The solar refrigeration system uses parabolic troughs to generate the heat from sunlight to heat a liquid, which creates steam to turn a turbine to make electricity. The goal is to make a system that is also able to work by burning natural gas or biomass, which can be readily available in rural areas.

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https://dsource.in/resource/kitchen-products/items-used-storage/oil-pots

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a. Masala Dabba
   8b. Matkas Ghadas
   8c. Refrigerators
   8d. Oil Pots
   8e. Oil Dispensers
   8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

Oil Pots

These pots are made of stainless steel in different gauges of 18 or 22. They are available in different sizes to hold different quantities of oil/ ghee. They have a container with a wide lip, covered by a steel lid with a knob attached on the top. This makes it easy to pour out the oil/ghee and also makes it easy to clean.

These are used mainly to store oil/ghee in the kitchen next to the cooking stove on the kitchen platform.

Sometimes a small ladle is positioned inside the oil pot, the handle of which projects out the lid, this basically helps to take out required quantities of oil from the pot, instead of pouring out oil, hence is a much more cleaner version.

Different types of oil pots

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   - 8a. Masala Dabba
   - 8b. Matkas Ghadas
   - 8c. Refrigerators
   - 8d. Oil Pots
   - 8e. Oil Dispensers
   - 8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

Design Resource

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a. Masala Dabba
   8b. Matkas Ghadas
   8c. Refrigerators
   8d. Oil Pots
   8e. Oil Dispensers
   8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

Design Resource

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   - 8a. Masala Dabba
   - 8b. Matkas Ghadas
   - 8c. Refrigerators
   - 8d. Oil Pots
   - 8e. Oil Dispensers
   - 8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

Design Resource

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   - 8a. Masala Dabba
   - 8b. Matkas Ghadas
   - 8c. Refrigerators
   - 8d. Oil Pots
   - 8e. Oil Dispensers
   - 8f, 8g, 8h, 8i
9. Further Links
10. Contact Details

Design Resource

Kitchen Products

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Source:
https://dsource.in/resource/kitchen-products/items-used-storage/oil-dispensers

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a, 8b, 8c, 8d
   8e. Oil Dispensers
   8f. Dabbas
   8g. Steel Tiffins
   8h. Ceramic Jars
   8i. Bharani
9. Further Links
10. Contact Details

Oil Dispensers

Stainless steel oil dispensers are used in keeping and dispensing edible oil in the kitchen. These products are available in different dimensions, weights and capacities. These have a spout to pour out oil and a detachable lid attached to a long cylindrical body.

[Image source]

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Source:
https://dsource.in/resource/kitchen-products/items-used-storage/dabbas

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a, 8b, 8c, 8d
   8e. Oil Dispensers
   8f. Dabbas
   8g. Steel Tiffins
   8h. Ceramic Jars
   8i. Bharani
9. Further Links
10. Contact Details

Dabbas

These are used for storage of cooked or uncooked food. The round, and cylindrical shapes are more popular than the square or the rectangular shapes. They are available with different capacities. They vary in height, diameter, thus a wide variety is available in stainless steel or aluminium. The gauge of Stainless steel used is 18 or 22.

The styling of the container and the lid is varied, and there are no standard styling procedures that are followed in the manufacturing. They are available in highly polished finish or matt or brushed steel finish and sometimes in a combination of finishes too. Some have decorative designs on them. Some have perforations on the lid as well as the container which allow air to circulate in the dabba, thus keeping the contents fresh, especially useful for storing herbs and green chillies etc in a refrigerator.

Different types of Dabbas

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https://dsource.in/resource/kitchen-products/items-used-storage/dabbas

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a, 8b, 8c, 8d
   8e. Oil Dispensers
   8f. Dabbas
   8g. Steel Tiffins
   8h. Ceramic Jars
   8i. Bharani
9. Further Links
10. Contact Details

Design Resource

Kitchen Products

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Source:
https://dsource.in/resource/kitchen-products/items-used-storage/steel-tiffins

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a, 8b, 8c, 8d
   8e. Oil Dispensers
   8f. Dabbas
   8g. Steel Tiffins
   8h. Ceramic Jars
   8i. Bharani
9. Further Links
10. Contact Details

Steel Tiffins

Stainless steel tiffins are available in different sizes and shapes to suit the specific needs. They can be 4 tiered, 3 tiered or 2 tiered with 4, 3 or 2 containers which are stacked one on top of the other with a tight lid on the topmost container. They are locked into place by an arrangement on the sides. Sometimes these locks itself act as handles to pick up and carry the tiffins or there may be another handle attached to the lid on top. They are available in aluminium too. They are very popular in India to carry a 2 course or 3 course meals to work for lunch, for travelling long distances, picnic etc.

5 tiered steel tiffin

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a, 8b, 8c, 8d
   8e. Oil Dispensers
   8f. Dabbas
   8g. Steel Tiffins
   8h. Ceramic Jars
   8i. Bharani
9. Further Links
10. Contact Details

Design Resource

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Source:
https://dsource.in/resource/kitchen-products/items-used-storage/ceramic-jars

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a, 8b, 8c, 8d
   8e. Oil Dispensers
   8f. Dabbas
   8g. Steel Tiffins
   8h. Ceramic Jars
   8i. Bharani
9. Further Links
10. Contact Details

Ceramic Jars

There are many kinds of ceramic ware used in the Indian kitchens for various purposes.
Traditionally ceramic jars were used to store pickles like mango, lime and amla (gooseberry) etc. They are a part of the traditional kitchenware with a specific colouring and form. They have a cylindrical shaped jar with a curved neck. A lid with a knob sits inside the wide neck of the jar. They are available in various sizes too.

The pickles stored in these jars never spoil, possibly because of the properties of the ceramic material used

Different forms and sizes of the ceramic jars
[Image source]

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1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   - 8a, 8b, 8c, 8d
   - 8e. Oil Dispensers
   - 8f. Dabbas
   - 8g. Steel Tiffins
   - 8h. Ceramic Jars
   - 8i. Bharani
9. Further Links
10. Contact Details

Hand painted pickle sets are used to keep pickles
[Image source]

Pickles in ceramic jars
[Image source]

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Source:
https://dsource.in/resource/kitchen-products/items-used-storage/bharani

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a, 8b, 8c, 8d
   8e. Oil Dispensers
   8f. Dabbas
   8g. Steel Tiffins
   8h. Ceramic Jars
   8i. Bharani
9. Further Links
10. Contact Details

Bharani

Baranis are cylindrical containers with a welded neck, made from stainless steel or aluminium and are available in various shapes, sizes and volumes. They have a long handle which helps them to be hung easily from a bicycle handle as these are commonly used to carry fluids like milk etc.

Stainless steel bharani

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Source:
https://dsource.in/resource/kitchen-products/items-used-storage/bharani

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   - 8a, 8b, 8c, 8d
   - 8e. Oil Dispensers
   - 8f. Dabbas
   - 8g. Steel Tiffins
   - 8h. Ceramic Jars
   - 8i. Bharani
9. Further Links
10. Contact Details

Design Resource

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Source:
https://dsource.in/resource/kitchen-products/items-used-storage/bharani

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
   8a, 8b, 8c, 8d
   8e. Oil Dispensers
   8f. Dabbas
   8g. Steel Tiffins
   8h. Ceramic Jars
   8i. Bharani
9. Further Links
10. Contact Details

Design Resource

Kitchen Products

The Sanctum Sanctorum of the Indian household

by
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Source:
https://dsource.in/resource/kitchen-products/further-links

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

Further Links

- IDC Journal - Design Thoughts - January 2009
- Useful resource e-links related to 'Product Design' in India
- Product Design at IDC IIT Bombay
- Kelkar Museum at Pune

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https://dsource.in/resource/kitchen-products/contact-details

1. Introduction
2. Utensils of Cooking
3. Utensils for Drinking
4. Utensils Used for Eating
5. Additional Items
6. Stoves
7. Kitchen Helpers
8. Items Used for Storage
9. Further Links
10. Contact Details

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